BUREAU OF HYGIENE AND TROPICAL DISEASES.

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HELMINTHIASIS.

ABDEL SHAFI. **Historical Review of Egyptian Splenomegaly and Allied Conditions.**—*Jl. Egyptian Med. Assoc.* 1936. Oct. & Nov. Vol. 19. Nos. 10 & 11. pp. 561–591 ; 631–651.

——. **Critical Study of the Different Theories on the Aetiology of "Egyptian Splenomegaly."**—*Ibid.* Nov. Vol. 19. No. 11. pp. 652–672.

ABDEL SHAFY MOHAMED. **Egyptian Splenomegaly. Part III. Studies on Schistosome Toxins.**—*Ibid.* Dec. No. 12. pp. 737–748.

The name "Egyptian splenomegaly" ought to disappear for the disease is found wherever intestinal schistosomiasis is endemic and there is much more in it than enlarged spleen. The name bilharzial hepatolienal fibrosis given by SALAH should be used.

The 3 papers have this range: I. An historical review in the first and part of the second papers. II. A critical study of the different theories of its causation. III. Studies on schistosome toxins filling the third paper.

I. This valuable summary would have had added value had a list of references been given. II. The disease was first thought to be protozoal-leishmaniasis. FERGUSON and DAY drew attention to its likeness to, or its identity with, Banti's disease; on this basis RICHARDS started taking away the spleen with good results. As to mechanism, DAY put it down to congestion from fibrosis of the liver caused by ova of *S. mansoni*, while GUIRGIS held this to be caused by male worms, ONSY put in down to long continued deposits of eggs in the spleen, KHALIL to hepatic cirrhosis from chronic intestinal toxaemia, SERRA to the toxic action of cercariae through the spleen, AGATY to local action of ova in liver, spleen and marrow. III. As to toxins these are the author's conclusions.—

"As a result of naked-eye and histological examinations of a large series of bodies for bilharzial lesions, I can safely state that although the incidence of ova in the liver is a fairly high one, the other organs and tissues forming the *schistosoma mansoni* 'area' always show much greater deposits of ova, and infection of the liver alone is an unknown thing. The high incidence of ova in the liver in some cases may be partially due to their being deposited in large veins and washed down by the portal blood to the liver. So bilharzial infection of the liver in splenomegaly cases is only a trifling factor compared to the extent of the infection and, therefore, we must not ignore the more important and more constant deposits in the lower regions of the *schistoma mansoni* area which largely

if not solely contribute to the production of endemic splenomegaly. To prove this contention, we only need to remember that in most cases of Egyptian splenomegaly the number of ova found in the liver is very small in comparison to the extensive cirrhotic changes occurring in that organ."

Clayton Lane.

Abdel Magid (I.). **Egyptian Splenomegaly in Edfina.**—*Jl. Egyptian Med. Assoc.* 1936. Nov. Vol. 19. No. 11. pp. 689–693.

"Pathological reports on 200 removed spleens showed that about 95 per cent. were bilharzial spleens, 2 per cent. were malarial and 3 per cent. showed mixed bilharzial and malarial infection. . . .

"In early stages of the disease the malpighian bodies show hyperactivity. There is dilatation and congestion of the venous sinuses and possibly interstitial and subcapsular haemorrhages. The reticulo-endothethial tissue shows hyperplasia. There is increase of fibrous tissue causing thickening of the capsule and trabeculae and also diffusely distributed in the entire pulp. There is considerable eosinophilic infiltration, may be giant cell formation and very rarely bilharzia ova. Intra-cellular granules and blood pigment due to increased phagocytic action are seen. In a few cases with coincident old malarial infection, there is also malarial pigment inside the cells. Later on, as the disease advances, there is gradual atrophy of the malpighian bodies, there may be atrophy in some places and activity in others and the reticulo-endothelial tissue becomes transformed into fibrous tissue. In very advanced cases the normal picture of the spleen disappears, the malpighian bodies are atrophied, the spleen pulp is scarce and almost entirely transformed into fibrous tissue and there may be calcarious deposits in the trabeculae. The weights of the spleens removed varied from 2·5 to 5·5 kg.

"The liver shows bilharzial periportal and diffuse cirrhosis with bilharzia ova, cellular infiltration and giant cells. There may be granular or fatty degeneration of liver cells and of necrotic foci. There may be adhesions due to attacks of peri-hepatitis.

"*The Blood Picture* is that of secondary anaemia and leucopenia with relative diminution in polymorphs and increase in eosinophyles and large hyaline cells."

C. L.

Gonzalez Bosch (Rodolfo) & Mosto (Domingo). Hidatidosis cardiáca. Hidatidosis cardíaca en un paciente con cuadro clínico-electrocardiográfico de infarto de miocardio. [**Hydatid Cysts of the Heart.**]—*Prensa Méd. Argentina.* 1937. Feb. 10. Vol. 24. No. 6. pp. 308–318. With 12 figs.

The patient was a man of 48 years with an eventful history. He was a Russian and at the age of 12 years suffered from polyarticular rheumatism and afterwards frequently had attacks of joint pain. He fought in the Great War and when the revolution broke out in Russia, being "contra-red" he escaped to Turkey where he stayed for eight years, and suffered from typhoid fever, typhus and bacillary dysentery and for some years was in poor health. He went to South America as one of a group of Cossacks giving exhibitions in horsemanship, and for the last five years worked as a carpenter. During these five years he had had six attacks of intense precordial pain and on his entry into hospital on 29th February, 1936, he had signs of myocardial infarct confirmed by electrocardiograph. W.R. and Kahn reactions negative. Hydatid was [for reasons not given] suspected and this

diagnosis was confirmed by marked intradermal reaction, eosinophilia (no ova in stools), pulmonary shadows, and their presence in the heart was suspected because of the " heart attack " eleven months before, irregularity of cardiac outline, absence of valvular lesions. He died two months after admission with signs of cerebral embolism. Limited post-mortem examination only was permitted, *viz.* of the thoracic viscera, and the findings were : Two hydatid cysts of the right lung, one in the left ; several small cysts at the hilum on both sides ; hydatid of pericardium, many in the right and left auricles and left ventricle. As the cranial cavity was not allowed to be opened, the cerebral embolism could not be proved. Illustrations are given of the electrocardiographs, the heart, the lungs and the microscopic anatomy of the heart and the cysts. *H. H. S.*

Sterling (Robert) & Guay (A. J. L.). **Invasion of the Female Generative Tract by** *Ascaris lumbricoides.*—*Jl. Amer. Med. Assoc.* 1936. Dec. 19. Vol. 107. No. 25. pp. 2046–2047.

The details of the invasion are these. A woman of 21 had lower abdominal pain and tenderness, and thickening and tenderness on both sides of the cervix. " Examination of the stool revealed Ascaris lumbricoides 4 plus, Necator americanus 3 plus, Trichuris trichiura 3 plus." On operation by a midline abdominal incision " Encysted in the right tube were five full grown and viable roundworms . . . one ascaris was found encysted in the cul de sac, surrounded by purulent exudate." There was no fistula. A drain was left in the cul de sac. The later events were : day 1, ascaris came through the incision ; day 2, ascaris came through the incision, faecal drainage, hexylresorcinol ; day 7, hexylresorcinol ; day 12, ascaris through the incision ; day 14, faecal drainage stopped, temperature 105° F., subtertian malaria parasites ; day 16, temperature became normal. After operation no ascaris eggs were seen in stool or discharge, no mention is made of the other worm eggs in the stool. *C. L.*

Headlee (William Hugh). **The Epidemiology of Human Ascariasis in the Metropolitan Area of New Orleans, Louisiana.**—*Amer. Jl. Hyg.* 1936. Nov. Vol. 24. No. 3. pp. 479–521. With 2 figs. [40 refs.]

Headlee examined the stools of 10,990 individuals by smear and by centrifuging after filtering through cheese cloth, and soil samples from about 74 special premises on which 79 families lived, the family being the unit of study. In the main, stools came from those who were attending out-patient departments, that is from the poorer classes. The percentages of infections seen were *E. histolytica* 8·1, *A. lumbricoides* 6·6, *N. americanus* 3·4, *T. trichiura* 8·5, *S. stercoralis* 2·5, *E. vermicularis* 1·6, *Taenia* species 0·2, *H. nana* 0·2. As to age, the incidence of ascaris was highest in those below 6, of trichuris in nearly adult life. 160 were members of ascaris families. There were 74 " special environments " where special investigations, including soil sampling of the backyards, were made. Of the 405 soil samples taken from all premises 53·1 per cent. had ascaris eggs in them and 28·4 those of trichuris, while there were also seen others identified as *E. vermicularis, Toxocara canis, T. cati, Ancylostoma caninum, Dipylidium caninum* and *H. diminuta.* About half the [ascaris] eggs held " motile infected larvae," nearly a fifth of the eggs were degenerate. Of the soil samples taken

from the surroundings of 13 premises in which negroes lived 80·9 per cent. had ascaris eggs in them, and while these places made up 17·6 per cent. of all examined, they included 36·6 per cent. of all ascaris eggs. In the places specially reported on, latrines were of 3 kinds; "sanitary toilets" inside the house connected with sewers in 42, toilets "of the sanitary type (having a sewer connection)" outside the house in 16, and "privy" types with no sewer connexion in 16. "The environments with privies had a larger percentage of positive foci than either of the other classes, and a greater percentage of positive environments was found among those with outside toilets than among those with inside toilets." As to defaecation in the backyard, this is believed to be exceptional and to be mainly the act of young children. Four cases of earth eating were discovered in persons with heavy infections. This example is given; 8 soil samples were taken in one backyard, No. 1 close to the outside toilet had in it 425 ascaris eggs in moist, packed and shaded earth, "it was at this spot that the children were supposed to have defaecated most frequently, but there were no visible signs of stools"; No. 2, the width of the yard away in loose humus, cinders and ashes, shaded all day, 24 ascaris eggs; No. 3 a little nearer to the toilet than No. 2 but with piled up cinders, 6; Nos. 4 and 5 close to the sewer vent which overflowed at times, 0 and 0; No. 6 and 8 from the main gutter 21 and 15, No. 7 from under the house where there was evidence that the children played 0. Under prevention, "the population group must be made conscious of the dangers of soil pollution, and *conscious of the dangers of coming in contact with infested soil*," and the same applies to the medical man for "he very rarely has knowledge concerning the life history of this parasite and the factors which influence its propagation and dissemination."

[The sentence with italics (they are in the original) is the essence of the author's view on prevention. By intention or oversight there is no mention of the evidence for carriage of ascaris eggs by wind (this *Bulletin*, 1934, Vol. 31, p. 605) and yet this paper by Headlee seems to me to strengthen that suggestion. As the spot map shows the ascaris infections in New Orleans are not evenly spread but are massed into clusters, and the figures on the map show that all but 2 of the non-sewered privies are in one or other of these clusters; it at least suggests that the privy is the centre for the spread of an air-borne (that is fly-borne or wind-borne) infection. In view of the evidence for air currents in the carriage of threadworm infection (Lentze, this *Bulletin*, 1936, Vol. 33, p. 121) the continuous, and at times deliberate, disregard of this possibility in ascaris infection is not in the interests of public health.] *C. L.*

Clapham (Phyllis A.). **Preliminary Observations on the Infectivity of *Ascaris lumbricoides* to Swine.**—*Jl. Helminthology.* 1936. Dec. Vol. 14. No. 4. pp. 229–232.

A hopeful method of causing pigs to become infected with *A. lumbricoides* from the pig is by giving a series of small doses.

The experiments had to be broken off because several members of the staff of the Institute of Agricultural Parasitology, London School of Hygiene and Tropical Medicine became sensitive.

"Resistance of the pig to Ascaris is of a doubtful nature so that immunological reactions are not likely to affect the method. If there is a resistance it is slight and of a temporary value for as has been shown, it is possible

to effect infestations in adult pigs. Second infections also may be induced very shortly after the first has been lost or even while it is still resident in the body of the animal. That there is something of the nature of a self-cure, however, is indicated again by Morgan's experiments in which the worm burden was completely lost although there was every opportunity for re-infection. This suggests that there may be some degree of acquired immunity." *C. L.*

Africa (Candido M.) & Garcia (Eusebio Y.). **Embryonated Eggs of *Ascaris lumbricoides* in the Mesenteric Tissue of Man, with Special Reference to the Possibility of Autoinfestation.**—*Jl. Philippine Islands Med. Assoc.* 1936. Aug. Vol. 16. No. 8. pp. 461–467. With 2 plates.

Embryonated and other ascaris eggs were present in the mesenteric tissue of a woman who died of peritonitis after rupture of her small intestine which had about 1,000 ascaris in it.

The rupture was a transverse slit, 4 cm. long, a foot above the ileo-caecal valve. In the abdomen were many dead ascaris in a thick yellowish fibrinopurulent exudate. "To the pathologist the rupture appeared to have taken place about 20 hours before death." In a piece of mesentery taken out at autopsy were pearl-like nodules about 2 mm. across. Under the microscope they were made up of a well limited mass of dividing fibroblasts, endothelial and round cells, a few polynuclears, no eosinophils, with at the centre ascaris eggs in development, or in most cases embryonated and apparently healthy with viable larvae, while some were empty. Round the ascaris eggs was a cordon of giant cells. "Indeed, beautifully formed giant cells were seen tugging at the contents of eviscerated eggs or fragments of them trying to engulf the foreign objects." That the eggs got there after their entry into the blood stream from the intestine and their deposit in spots in the mesentery is held unlikely. The number of eggs (there were as many as 80 in one section), the great tissue reaction, and the presence of many embryonated eggs (which need 9 to 15 days after oviposition to reach that stage) led to the suggestion that one or more ascaris had got into the peritoneum before the rupture which caused the woman's death. The possibility of autoinfection as a normal part of the life history comes under consideration. *C. L.*

Sindoni (Manlio). Ascaridiasi ed emorragia gastrica mortale. [**Ascariasis and Fatal Haematemesis.**]—*Riforma Med.* 1937. Jan. 16. Vol. 53. No. 3. pp. 86, 89–90. [29 refs.]

The author performed an autopsy on a woman of 41 years dying after a copious haematemesis. The stomach presented near the cardia, on the posterior wall, an irregular lesion about 1 cm. in diameter with necrotic margin and in the viscus and the intestine numerous ascarides. No other lesion was found and the author concludes that the worms were responsible for the fatal haemorrhage. *H. H. S.*

Schönfeld (W.). Ascarisextrakte und Haut. [**Skin-Sensitivity to Ascaris Extract.**]—*Arch. f. Dermat. u. Syph.* 1937. Jan. 2. Vol. 175. No. 1. pp. 54–70. With 5 figs. [51 refs.]

A study, essentially, of sensitiveness to ascaris.

There is widespread sensitiveness of the skin to extract of ascaris worms taken from man or pig; this applies to immediate as well as

delayed reactions. A skin hitherto insensitive becomes sensitized by repeated injections of ascaris extract. In certain circumstances there come into being anaphylactic shock with body-wide urticaria or asthma, and with, during its first hours, a fall in the eosinophils in the peripheral blood. But the skin-reaction from injections with ascaris extract is not specific; it is seen in infections with ascaris, enterobius and trichuris, and may be absent when there are worms and present when there is none. In children an immediate reaction is always present.

C. L.

CAMPBELL (Dan H.). **An Antigenic Polysaccharide Fraction of *Ascaris lumbricoides* (from Hog).**—*Jl. Infect. Dis.* 1936. Nov.–Dec. Vol. 59. No. 3. pp. 266–280. [17 refs.]

A polysaccharid from *Ascaris lumbricoides* of the pig is shown by precipitin, skin and anaphylactic tests to bring into being specific antibodies and to react with them in giving specific test reactions.

Its general characters are given: it is not affected by boiling or by proteolytic enzymes, cross reactions between it and protein fractions of the worm may well be caused by polysaccharid in the protein. Animal parasites may then be used to give a large amount of polysaccharid for immunological study. *C. L.*

WOLFE (E. D. B.). **Some Notes on a Hookworm and Roundworm Survey.**—*Malayan Med. Jl.* 1936. Dec. Vol. 11. No. 4. pp. 224–225.

The survey was by a smear examination made on one occasion only and the material from school children was collected in labelled cigarette tins; 415 of 460 children in five schools in Pahang East were examined.

The first school was situated on a tidal river bank; with bucket conservancy; the number examined was 154; the percentage infected with ascaris was 77·3 and with hookworms 30·5. The second school was in a rice-growing area with shallow pit latrines and very high ground water, and the corresponding figures were 28, 89·3 and 14·3; the third a fishing village with bad pit latrines, the figures 91, 84·6 and 62·6; the fourth a floating river "jamban," 51, 94·1, 19·6; the fifth a small inland town, with bucket conservancy, 91, 56, 19·8. The detected percentage of infection with ascaris was then between 56 and 94·1 and with hookworms from 14·3 to 62·6. *C. L.*

OSBURN (H. S.). **Hookworm in Natal Natives.**—*South African Med. Jl.* 1936. Oct. 24. Vol. 10. No. 20. pp. 710–712. With 1 map.

Of 199 stools of native male adults examined by a Willis floatation technique 30, or 15 per cent., had hookworm eggs in them, 5 of them had a history of sores on the feet. It is believed that the infection has no ill effects on these persons unless there is some other severe disease, but, if there is, the anaemia is greater than if there had been no hookworm infection. *C. L.*

Bacigalupo (Juan) & Pasqualini (Rodolfo Q.). Nuevo foco de anquilostomiasis en la provincia de Buenos Aires. [**A Fresh Focus of Ankylostomiasis in the Province of Buenos Aires.**]—*Semana Méd.* 1937. Jan. 21. Vol. 44. No. 3. pp. 198–201. With 3 figs.

The authors examined a soldier, 20 years of age, in the Central Military Hospital and found that he was harbouring *A. duodenale.* He came from Martinez, a few kilometres north of Buenos Aires. Examination of other members of his family, none of whom had ever been out of Buenos Aires, showed that the father aged 55 years and four brothers whose ages ranged between 23 and 12 years were all infected, the faeces containing 1,000 to 2,300 eggs per gram, by Stoll's method. *H. H. S.*

Upton (R. G.). **Incidence and Severity of Hookworm Infestation in East Texas.**—*Amer. Jl. Public Health.* 1936. Sept. Vol. 26. No. 9. pp. 924–926. [11 refs.]

Examinations of 1,883 school children show widespread infection with hookworms and 1·5 to 2 per cent. of infections with *Hymenolepis nana.* In 237, the Caldwell's method of diagnostic examination was used, as to the others there is no statement. *C. L.*

Leathers (W. S.), Keller (A. E.) & Wyman (B. F.). **A State-Wide Investigation of Hookworm in South Carolina.**—*Amer. Jl. Hyg.* 1936. May. Vol. 23. No. 3. pp. 600–614. With 3 maps & 1 graph.

With reference to the reviewer's remarks on the above-named paper [this *Bulletin,* 1937, Vol. 34, p. 25] Dr. W. S. Leathers writes confirming the calculation made in these remarks, namely that the figure for the incidence of hookworm infection in Saluda County, S. Carolina, appearing in the paper as 41·2 should be 4·12 per cent., an error due to an undetected and regretted misplacement of the decimal point. *C. L.*

Palazzo (Marco Quinto). Il primo caso di anchilostomiasi riscontrato in Cirenaica. [**The First Case of Ankylostomiasis met with in Cirenaica.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1936. Oct. Vol. 17. No. 10. pp. 628–633. With 4 figs. (2 maps).

The patient was a girl of 12 years, anaemic, weak, with a history of geophagy ; red cells 2,320,000, white 8,200 per cmm., Hb 32 per cent., C.I. 0·7. Ova of *A. duodenale* were present in the faeces. The child had come to Cirenaica from Egypt. The author wishes to record the case, because, he states, hookworm infestation is new to Cirenaica and practitioners ought to be on the look-out for possible cases in order that imported cases may not unwittingly spread infection.

H. H. S.

NISHI (Masanori). **A Biological Investigation on the Family Ancylostomidae. With Special Reference on the Results of an Experimental Investigation into the Rate of Infection, Immunity and the Site of Parasitism within the Lumen of the Alimentary Tract.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1936. Dec. Vol. 35. No. 12 (381). [In Japanese pp. 2744–2760. With 3 charts. [51 refs.] English summary pp. 2760–2761.]

The paper deals with *Ancylostoma caninum* in the dog. Most parasites lie about the middle of the small intestine's length though the large intestine may contain them even when the small has none. Youth and smallness of the dog, and a first infection, are the conditions in which larvae reach adult life in the largest numbers. *C. L.*

BACIGALUPO (Juan) & LORETTI (Guido). La eritrosedimentación en la ancylostomiasis provocada por Ancylostoma duodenale. [**Corpuscle Sedimentation Rate in Ancylostomiasis.**]—*Semana Méd.* 1937. Jan. 28. Vol. 44. No. 4. pp. 262–264.

The authors have carried out the corpuscle sedimentation test in cases of infestation by *A. duodenale*, some of them severe with haemoglobin reduction to 61 per cent. and eosinophiles 18·5 per cent. of total leucocytes, but determined no departure from the normal. Although, or perhaps because, the findings were negative, they are worth recording since a change in sedimentation rate has been reported in several tropical conditions. *H. H. S.*

MEYERS (F. M.). Anchylostomiasis en bloedarmoede. [**Ankylostomiasis and Anaemia.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1936. Nov. 24. Vol. 76. No. 47. pp. 3046–3055. With 1 fig. [22 refs.]

A survey of the literature for Dutch readers leads to the conclusion that direct treatment of the anaemia is as important as unworming and hygienic prevention. *C. L.*

KRÖBER (F.). Ein Fall von schwerer Chenopodiumölvergiftung, der in Heilung ausging. [**A Severe, but Non-Fatal, Case of Poisoning by Oil of Chenopodium.**]—*Deut. Med. Woch.* 1936. Oct. 23. Vol. 62. No. 43. p. 1759.

Judging by what was left in the bottle the man helped himself to 10 or 12 cc. of oil of chenopodium.

He was " boy " to a hospital sister. Vomiting (the vomit smelling of the oil), semiconsciousness, an appearance as of drunkenness, muscular spasms, some fever, smell of chenopodium in the breath and, after a saline aperient, in the stools, pupils dilated, sight and hearing lessened, and the pressure of spinal fluid raised—such were the chief immediate symptoms. Six months later the left arm and leg were spastic, with increased tendon reflexes and wasted and weakened muscles. The special senses seemed undamaged, as were bladder and bowel. Other investigations showed normal states. *C. L.*

Ohl. Praktische Erfahrungen mit dem neuartigen Wurmmittel Helmofix. [**Practical Experiences with Helmofix, a New Anthelmintic.**]—*Muench. Med. Woch.* 1936. Oct. 16. Vol. 83. No. 42. pp. 1719–1720.

Helmofix capsules are recommended for the simplicity of their administration and the certainty of their action against all kinds of worms. The capsules contain paracymol, thymol, kamala and castor oil. Paracymol is a synthetic product which is claimed to be half as toxic but as effective as oil of chenopodium. [The doses of these poisonous constituents in a capsule are not given, and of course the toxicity of oil of chenopodium depends on the amount in any specimen of its variable constituent ascaridol.] Although the emphatic claim is for the destruction of all worms, among the 123 cases treated the worms mentioned are ascaris, enterobius and in 3 persons tapeworms of unstated kind. *C. L.*

Guichard (F.). La rotenone. Essai thérapeutique-toxicité. [**Toxicity of Rotenone used as an Anthelmintic.**]—*Ann. de Méd. et de Pharm. Colon.* 1936. July–Aug.–Sept. Vol. 34. No. 3. pp. 751–754.

Rotenone ($C_{23}H_{22}O_6$) from the roots of creepers of the genus Derris is ineffective against man's hookworms and is rarely well supported even in a dose of 20 mgm. *C. L.*

Faust (Ernest Carroll). **The Use of Anthelmintics.**—*Jl. Amer. Med. Assoc.* 1937. Jan. 30. Vol. 108. No. 5. pp. 386–392.

Various anthelmintics are considered.

Beta naphthol.—"It is contraindicated in nephritis and in malaria . . . . In view of its relatively low efficiency and high toxicity, its use as an anthelmintic may well be abandoned."

Thymol.—"It is less toxic but much less efficient than carbon tetrachloride and is both more toxic and less efficient than tetrachlorethylene for eradication of hookworms . . . . Clayton Lane is the only distinguished present-day advocate of thymol as the drug of choice in hookworm infection."

Oil of chenopodium.—"U.S.P. . . . 'contains not less than 60 per cent. and not more than 80 per cent. of an acetic-soluble fraction' (*i.e.*, ascaridol) . . . . The therapeutic dose for an adult is from 1·5 to 3 cc." [The minimum lethal dose is less than 3 cc. (Howard, this *Bulletin*, 1919, Vol. 14, p. 159).] It is "contraindicated in nephritis, organic heart disease, hepatic dysfunction or ulceration of the intestine. It should be administered only under the direct supervision of a physician."

Carbon tetrachloride. "It has been utilized in hundreds of thousands of human cases, with very efficient results and relatively few deaths due to its administration . . . . The therapeutic adult dose is 3 cc. of the pure drug. [The minimum lethal dose is 1·5 cc.] . . . It has about 90 per cent. efficiency for eradication of hookworms but should not be administered alone when ascaris is present . . . [nor] in the presence of absorbable fats or when blood calcium is below normal." [A test which is certainly not used when the drug is given in herd or even in mass fashion.]

Tetrachlorethylene.—"It has a cure rate of about 90 per cent. for hookworms, especially Necator americanus. [Maplestone and

MUKERJI using the most accurate test at present available, namely D.C.F., found a cure rate of 20·8 per cent. for hookworms (this *Bulletin*, 1930, Vol. 27, p. 419).] . . . No deaths have been reported after its use in more than 100,000 cases of hookworm infection."

Hexylresorcinol.—" According to LAMSON and WARD a therapeutic dose (1 gm. of the crystoid for adults and children over 10 years of age in hard gelatin capsules of 0·2 gm. capacity each) is . . . from 80 to 85 per cent. [efficient] for hookworms." [Again, MAPLESTONE and MUKERJI (this *Bulletin*, 1933, Vol. 30, p. 205) using D.C.F. for diagnosis and giving 1 gm. of the drug in hard gelatin capsules to patients in hospital under strict fasting had a cure rate for hookworms of 7·7 per cent. only.] Its efficiency for ascaris is put as 90 to 100 per cent., and for trichuris 40 to 45.

Ficin, being crude sap, has at present to be used at once but if " made available for the medical profession it may provide a relatively non-toxic specific anthelmintic for Trichocephalus and Enterobius."

There is noted the work largely by Faust himself on methyl violet for *Clonorchis sinensis* and *Strongyloides stercoralis*, the use of male fern for tapeworms, of potassium antimony tartrate for schistosomes, the myositis of trichinosis and dracontiasis, of emetine hydrochloride for schistosomes, the liver fluke and Paragonimus and ethyl chloride for creeping eruption. The different infections are then taken up from the point of view of the anthelmintic treatment of each.

" This is one of a series of articles written by eminent authorities for the purpose of extending information concerning the official medicines." [But for dangerous medicines as agents of medical treatment, should not the authoritative spokesman be a medical man ?]

C. L.

LANE (Clayton). **What Drug best kills Hookworms ?**—Reprinted from *Amer. Jl. Digestive Diseases & Nutrition.* 1936. Dec. Vol. 3. No. 10. pp. 770–772. [21 refs.]

" Since hookworms rarely kill directly there is no justification for putting efficiency of anthelmintics before their safety."

" For individual, community, or medical man investigating anthelmintics, complete deworming is the only stable aim. The deadliness of anthelmintics is urged against this aim. But, before reaching the dangerous stage, thymol and tetrachlorethylene, like alcohol, give warning which makes for safety. Though it was probably these timely symptoms which led to the disuse of thymol, they are now being used to recommend tetrachlorethylene. The evidence for the safety of thymol is more solid than for any other drugs, so the objection to deworming by it is poorly based ; its efficiency depends upon particulation, but the effect of the finest particulation has never been measured. Tetrachlorethylene merits controlled tests on a proper scale. The cheapness of beta-naphthol is no balance to its risks. Oil of chenopodium must not be given without knowledge of its ascaridole content, seeing how near together are the optimum and minimum lethal doses ; its production of deafness is not negligible. Carbon tetrachloride is liable to be either highly extolled or dropped when it kills ; to look before giving it for the factors known to make for deadliness is constantly neglected ; with oil of chenopodium it lies under grave suspicion of ruining health and causing death in South America with simulation of yellow fever. Hexylresorcinol ' also ran,' not having fulfilled the expectations of its introducers.

" There is urgent need for the carrying through by experienced medical men of controlled comparative tests on an adequate scale to determine

on the only stable basis—deworming—what anthelmintic is the safest and most effective in the expulsion of hookworm. Such stable knowledge is long overdue."

C. L.

Chung (Huei-Lan). **Observations on the Filariform Larvae of *Strongyloides fülleborni* in Different Media as well as in Tissue Cultures.**—*Ztschr. f. Parasitenk.* 1936. Dec. 15. Vol. 9. No. 1. pp. 28–49. With 4 figs. [15 refs.]

Growth of the larvae of *Strongyloides fülleborni* in different culture media and tissues was nearly absent.

The media into which the larvae were implanted were plasma or serum of rabbit, dog, sheep, monkey, living bits of kidney, testis, lung and liver of rabbit, or of the tissue of the chick embryo in Tyrode solution or serum; extracts of these tissues; and tissue cultures of corneal epithelium, liver and lung in rabbit plasma or spleen extract. They lived for many days unless there were bacterial contamination which soon killed them. When they lived long there was an insignificant amount of growth (except in one larva which increased to 980μ) and no development. In like manner sterile larvae of *Ascaris lumbricoides* lived for 2 days in such media without development.

C. L.

Sandground (J. H.). **On the Potential Longevity of Various Helminths with a Record for a Species of *Trichostrongylus* in Man.**—*Jl. Parasitology.* 1936. Oct. Vol. 22. No. 5. pp. 464–470. [16 refs.]

An infection, probably of Trichostrongylus, possibly of *T. colubriformis* still persisting after 8½ years.

After giving records which put the life spans of various helminths as being of various lengths for the same species Sandground tells of what is evidently a self-immolation with the ova still present 8½ years later. They are judged to be those of *T. colubriformis*. [The report seems to be that of which there was an abstract in this *Bulletin*, 1930, Vol. 27, p. 468, but, as the reference given in the text is one of the ten which are not present in the list at the end, one is not sure.] *C. L.*

Gharpure (P. V.) & Gharpure (V. V.). **The Rarity of the Male *Enterobius vermicularis*.**—*Indian Med. Gaz.* 1937. Jan. Vol. 72. No. 1. p. 23.

The male *E. vermicularis* is not rare in the appendix.

The appendix, tied at the base and cut off at operation or after death was opened and as many as 12 males have been found in one. "They are very tiny, transparent, and often embedded in faeces" and their character is probably responsible for their supposed rarity. "We have not investigated in the same manner stools or intestinal contents from post mortems."

[As to stools, male enterobius were found in great numbers for the reviewer in Bengal by one sweeper prisoner, and by one only, in the stools of his fellows after anthelmintics given for hookworms. The price, to be his on his release was, I think, an anna (say a penny) a hundred, and I got many hundreds. In this infection they must be common and as commonly missed.] *C. L.*

HEYDON (G. A. M.). **Oxyuriasis : a Possible Main Source of Infestation.** [Correspondence.]—*Med. Jl. Australia.* 1936. Dec. 26. 23rd Year. Vol. 2. No. 26. p. 899.

Heydon holds that, in addition to the propagation of these worms by the creeping of the females out of the anus and the ingestion of the eggs, these are laid within the body and become adult without leaving the body. [LENTZE, in proving air carriage of these eggs, held that for their development they had to be 6 hours in an acid medium and that they could not get this without leaving the anus and coming to the stomach by the oesophagus, this *Bulletin*, 1936, Vol. 33, p. 121.]

C. L.

MCNAUGHT (James B.) & ANDERSON (Eugene V.). **The Incidence of Trichinosis in San Francisco.**—*Jl. Amer. Med. Assoc.* 1936. Oct. 31. Vol. 107. No. 18. pp. 1446–1448. With 3 figs.

"1. Digestion of 200 human diaphragms obtained at autopsy in San Francisco from individuals ranging from 2 to 87 years of age revealed forty-eight (24 per cent.) infected with Trichinella spiralis.

"2. Examination of diaphragms from twenty-five new-born infants gave negative results.

"3. Living larvae were found in all the positive cases.

"4. The number of larvae was usually small, being less than twenty to each 50 gm. of muscle in 79 per cent. of the cases.

"5. None of the clinical records of the positive cases revealed a definite history of trichinosis.

"6. The highest eosinophil count recorded was 4 per cent.

"7. The heart muscle from fifteen patients with trichinous diaphragms was negative.

"8. Microscopic examination of stained slides for Trichinella is inadequate.

"9. Since there are no practical methods of inspection for trichinous meat, the consumer must assume the responsibility of preventing trichinosis by thoroughly cooking all fresh pork." *C. L.*

BACHMAN (George W.) & GONZÁLEZ (José Oliver). **Immunization in Rats against** *Trichinella spiralis.*—*Proc. Soc. Experim. Biol. & Med.* 1936. Nov. Vol. 35. No. 2. pp. 215–217.

"Our observations record that the only protection given to rats for a limited period of time against infestations of *Trichinella spiralis* was the feeding of small and gradually increased doses of trichinous meat. Attempts to protect rats by feeding anti- and convalescent serums, trichina powder, and by injecting intraperitoneally Coca's suspension of the dried and finely ground larvae failed to give any protection."

SPINK (W. W.). **Trichinella Antigen : Further Observations on its Use in the Diagnosis of Trichinosis.**—*New England Jl. of Med.* 1937. Jan. 7. Vol. 216. No. 1. pp. 5–8. With 2 charts. [20 refs.]

The antigen is made thus :—Thirty days after guineapigs have been fed on trichinosed meat, their muscles are finely chopped, digested in 0·4 per cent. pepsin and 0·3 per cent. hydrochloric acid in water, and incubated at 38°C. for 15 hours with frequent stirring. The solution

is put through wire meshes of 16 and 40 to the inch, left to stand, repeatedly washed by adding tap water and syphoning, dried, put in ether for 24 hours, then for 24 hours in a vacuum, over sulphuric acid, powdered, extracted for 3 days in Coca's solution (NaCl 0·7, $NaHCO_3$ 0·05, carbolic acid 0·4, distilled water to 100), passed through a No. 3 Seitz filter, and kept in rubber covered vessels.

For the test, 1·0 cc. of a 1 : 10,000 dilution of the antigen in Coca's solution is injected intradermally into the flexor surface of the forearm.

" On the basis of 4 years' experience, it is recommended that these tests be utilized routinely as aids in the diagnosis of doubtful cases of trichinosis.

" During the first few days after infection, the skin reaction may be of the delayed, tuberculin type. At the beginning or during the second week after infection, the reaction to intracutaneous trichinella antigen is of the immediate type.

" Precipitins appear in the blood as early as the second week after infection, but usually during the fourth week." *C. L.*

Jackson (R. B.). **Some Observations on the Occurrence of Filarial Infection in Mosquito and Man in the Colony of Hong Kong.**—*Chinese Med. Jl.* 1936. Dec. Vol. 50. No. 12. pp. 1767–1772.

Morning catches of mosquitoes made in dwelling places, mostly huts, show that the most important carrier of filariasis is different in different parts of the area, if the larval filariae in mosquitoes were those of *W. bancrofti*. In Little Hong Kong it is *Anopheles minimus*, in the Shin Mun Labour Camps it is *A. jeyporiensis candidiensis*. Locally *Microfilaria malayi* has not been seen.

At Little Hong Kong there were made during 4 years 11,169 dissections of *A. minimus* with 152 infections, the corresponding numbers for *A. jeyporiensis candidiensis* being 424 and 8 and for *Culex fatigans* 1,104 and 16 ; the second is then the better intermediate host, but the first was the most dangerous locally. In collections made over 3 years at Shing Mun Camp *A. jeyporiensis candidiensis* was the most dangerous insect reported—92 infections in 19,965 dissected, the infections in 4,818 *A. minimus* varied much from year to year, falling from 0·7 to 0·09, while in 12,075 *A. hyrcanus sinensis* 6 infections in 3 years [the percentage of 0·77 from 4 infections among 5,245 dissections in 1934 is of course a misprint for 0·07]. *C. fatigans* was apparently not caught at this labour camp.

In experimental feedings of mosquitoes bred from larvae or pupae and fed on blood with 199 microfilariae to 20 cmm., the percentage becoming infected and the average and maximum numbers of larvae undergoing development in any insect were for *C. fatigans* 78·6, 5·2, and 48, for *A. hyrcanus sinensis* 33·3, 7·1 and 43. When fed on a man having 66 microfilariae [presumably in 20 cmm. of blood], the corresponding figures were for *A. minimus* 40, 1·5 and 2, for *A. maculatus* 36·4, 6·7 and 18, for *Aëdes* (*F.*) *togoi* 50, 4.87 and 14, and for *Aë. albopictus* 0 of 8. *C. L.*

Gebert (S.). **Notes on Filariasis and its Transmission by Mauritian Anophelines.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. Jan. 26. Vol. 30. No. 4. pp. 477–480.

Infection of man and mosquito with *Wuchereria bancrofti* in Mauritius has been studied.

Blood films of 1,683 persons admitted to the Civil Hospital and examined at an unstated hour showed these percentages of infection :— In St. Louis, males 9·1, females 3·0 ; in other districts, males 11·6, females 3·1. No satisfactory explanation of the higher rate in males could be found. The infection rate varied much, even in different parts of St. Louis, being as high as 28, and highest near streams or open drains.

" The figures obtained do not show the actual infection rate for there is a definite periodicity, filarial embryos disappearing from the circulation from time to time for periods of several days' duration. Furthermore, slight infections are easily overlooked. The season of the year also appears to influence the occurrence of embryos in the peripheral blood. These are generally more numerous in the cool season, with the result that a higher percentage of cases is detected at this time of the year. Another effect of this variation is the greater transmission in winter in the coastal belt where the temperature does not fall low enough to produce a decrease in the number of anophelines."

Infection is carried by *Culex fatigans*, *Anopheles costalis*, *A. funestus* and *A. maculipalpis*. Development in the second and third insects was complete in 16, in the last in 19, days, but was not complete in *A. mauritianus*, the temperature being between 17·7°C. and 32·7°C., mean about 20°C. *C. L.*

Khalil (M.). **Filariasis and Elephantiasis in Rossetta and the Means of their Effective Control.**—*Jl. Egyptian Med. Assoc.* 1936. Dec. Vol. 19. No. 12. pp. 701–716. With 5 figs. & 1 folding map.

Elephantiasis is so common in Rossetta that its name in Arabic is Rossetta leg.

In 1,000 blood examinations on unselected persons taken from 5 different parts of the town the incidence of *Mf. bancrofti* was 10·2 per cent., while 18 of them had elephantiasis of one or both legs. What is locally named erysipelas is common. The percentage of infection outside, but near, the town is low. There are over 1,000 wells in the town with brackish water unfit to drink, the percentage of salt being 0·7, for at low Nile the sea comes up here. Drinking water is got either by storing Nile water in cisterns under houses to which it is carted during high Nile, or by a pipe supply which about a quarter of the houses take and have to pay rather heavily for. Accordingly, for washing purposes the wells are still in use. In nearly a quarter of them *Culex pipiens* breeds, the proved host of *W. bancrofti* in Egypt. Compulsory closing of wells and cisterns is advised. *C. L.*

O'Connor (F. W.). **Filariasis in Antigua.**—*Jl. Trop. Med. & Hyg.* 1937. Feb. 1 & 15. Vol. 40. Nos. 3 & 4. pp. 25–31 ; 42–48. With 1 map & 1 chart. [44 refs.]

A study of 2,537 persons (1,116 males and 1,421 females) by questioning, physical examination and blood examination.

The island is a rough oblong of 108 sq. miles, in latitude 17°N., with an average rainfall of 45 in., and made up of 3 strips which, from north-east to south-west, are—undulating limestone always less than 500 feet above sea level and swept by the eastern trades, a central clay strip rarely more than 50 feet above sea level, and a volcanic strip going as high as 1,330 feet. After taking up the general

and medical history, the note on that of filariasis makes a start with elephantiasis as reported by HENDY in 1784. The population is about 33,000 with 90 per cent. negro or mulatto. The study was made between 8 p.m. and midnight, or sometimes as late as 2 a.m., and included examination of epitrochlear and subinguinal glands (not the inguinal glands, venereal disease being common) and of the limbs, and in males of the scrotum for hydrocele and cysts of the epididymis. Finger blood was taken to the amount of 20 cmm. As to the counts of microfilariae, note is made that since numbers vary at the different hours at which blood was taken, these are not the whole picture, but are at least significant.

As between the three strips of which the island is made, the percentages in the volcanic strip, the clay strip and the limestone strip are—microfilariae in blood, 21, 26·3, 19·5; symptoms with no microfilariae, 7·8, 12·3, 3·66; elephantiasis with no microfilariae 2·8, 5·1, 2·1; total with filariasis 31·3, 43·8, 25·3; and the percentage of persons on Antigua with evidence of filariasis is 38·5. As to the cause of this, the houses are mostly shacks of 1 or 2 rooms, in which 8 to 16 persons sleep, with all possible sources of ventilation shut at night and swarms of mosquitoes active. Family prevalence of filariasis is high, in one family of 13 all had symptoms, though only 2 were still infective with microfilariae in the blood. Nearly all cases of elephantiasis were of the lower limbs and 48 of 124 gave no history of lymphangitis or adenitis. There had been abscess in 17, with microfilariae in the blood in 4. Iliac abscess should be specially in mind. A varicose lymph gland was seen once only on a clinical scale, though microscopically the condition is common. *Culex fatigans* has natural, and was given artificial, infection and can complete its development all the year round, at least near sea level. Enlarged glands are treated with caution as a sign of filariasis, for syphilis and yaws are present. *Mf. ozzardi* was present, among others, in two persons who had never left the island and *Culicoides furens* is present in some parts of the coast. The Feines Institute is a centre of infection.

C. L.

GALLIARD (Henri). À propos de l'attraction des microfilaires de Bancroft par la sécrétion salivaires des moustiques. [**Attraction of *Microfilaria bancrofti* by the Salivary Secretion of Mosquitoes.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1936. July–Aug.–Sept. Vol. 14. No. 7. pp. 977–980.

It is concluded that the salivary secretion of certain mosquitoes has an attraction for *Microfilaria bancrofti.*

With small infections there was held to be a feeble attraction by *Culex fatigans, Anopheles sinensis* and *Mansonia indiana* and absolutely none with *Stegomyia fasciata, Stegomyia albopicta* and *Armigeres obturbans* in spite of the large quantity of blood taken by the last. In *C. fatigans* there may be 5 times to a third as many in the mosquito's stomach as in the same quantity of circulating blood, in *A. sinensis* from twice to a fifth, in *A. argenteus* none where there were 16 in a drop of blood. Examination of blood from the bitten point has given no evidence of attraction to it.

[The bit of evidence missing, but necessary before the author's conclusion may be taken as correct, is the extent to which different

mosquitoes pass plasma, corpuscles and microfilaria *per anum* while or after they feed. O'Connor has shown the presence of such passage of microfilariae by *C. fatigans*.] *C. L.*

Galliard (Henri). Infestation expérimentale de *Mansonia indiana* Edwards avec les embryons de la filaire de Bancroft, au Tonkin. [**Experimental Infestation of** *Mansonia indiana* **with Embryos of** *W. bancrofti*, **in Tonking.**]—*Ann. Parasit. Humaine et Comparée.* 1936. Sept. 1. Vol. 14. No. 5. pp. 495–496.

Mansonia indiana is unlikely to be an important factor in the spread of infection by *W. bancrofti* in the Tonking delta.

While the percentage of *Culex fatigans* fed on an infected man was 80, that in *M. indiana*, apparently in like conditions was 10,—2 of 20 kept for 15 days at a temperature between 28° and 30°C. *C. L.*

Suarez (Jenaro). **Clinical Findings in 139 Cases of Recurrent Tropical Lymphangitis.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1936. Sept. Vol. 12. No. 1. pp. 81–99. With 10 figs. & 2 plates. [13 refs.] [Spanish version pp. 100–113.]

A clinical discussion of 139 persons with recurrent tropical lymphangitis seen by Suarez in Porto Rico.

The prevalence is highest from June to September and highest of all in August. Taking all age decades in order from birth to 69 years, the total sufferers in each decade were 10, 31, 22, 22, 6, 7 and 2*; the site was one leg in 81, two legs in 13, and other parts in six. In most cases attacks took place once a month or oftener; there was relapse, usually within 2 or 3 days, in four. Elephantiasis was present in 18, and high degrees of it were twice as common in blacks as in whites. The bacterial rôle is discussed in view of the work by Drinker and his colleagues. The attack has always begun with a rigor, the rash has always progressed upwards. "Abscesses, cellulitis, and thrombophlebitis may be easily mistaken for recurrent lymphangitis. On the whole, it is easier to mistake other diseases for recurrent lymphangitis than to mistake lymphangitis for other diseases." *C. L.*

Pons (Juan A.). **The Treatment of Recurrent Tropical Lymphangitis with Special Reference to the Therapeutic Value of Streptococcus Vaccines and Filtrates.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1936. Sept. Vol. 12. No. 1. pp. 114–139. [24 refs.] [Spanish version pp. 140–167.]

"The results of the treatment of a group of cases with bacterial products —vaccines and filtrates—through a period of two years, seem to justify this preliminary report."

"From this study it seems that a vaccine made from streptococci isolated from cases of recurrent tropical lymphangitis during acute attacks is of value in preventing recurrences, for a time at least, in certain cases of this disease, and is capable of reducing the intensity or relative frequency, or both, in others. It can be estimated that about 40 per cent. of all patients so treated may be benefited. The addition of strains other than those of tropical lymphangitis does not seem to make the vaccine any more effective.

"Filtrates of cultures of streptococci isolated from these same cases seem to be even more effective than vaccines in preventing recurrences

* Unless otherwise stated all figures are percentages.

and reducing the severity, or the frequency, or both, of the pyrexial attacks. It seems as if it might be expected that about seventy per cent. of cases be so benefited when treated with such filtrate in appropriate doses, intradermally or subcutaneously, or the two."

C. L.

Morales Otero (P.) & Pomales Lebrón (A.). **Immunological Response of Cases of Recurrent Tropical Lymphangitis to Haemolytic Streptococci and their Products.**—*Puerto Rico Jl. Public Health & Trop. Med.* 1936. Sept. Vol. 12. No. 1. pp. 43–66. With 1 fig. & 9 charts. [14 refs.] [Spanish version pp. 67–80.] [Summary appears also in *Bulletin of Hygiene.*]

Agglutinins against haemolytic streptococci were demonstrated in nearly every case of recurrent tropical lymphangitis (68 examined). They were also demonstrated in patients suffering from other diseases and in normal individuals but in lower concentration. Many cases of tropical lymphangitis gave allergic reactions to skin injections of haemolytic streptococcus filtrate. This allergic reaction disappears during the febrile periods of the disease. Antistreptolysin determinations were made in cases of recurrent tropical lymphangitis, in normal cases, and in cases of other diseases. There is a definite increase in the antistreptolysin content of the blood of most cases of tropical lymphangitis as compared with normals. As a rule there is an increase in antistreptolysin from one to seven days after the onset. At a later stage the values gradually decrease. Plasma clot from patients with tropical lymphangitis develops a definite resistance to the fibrinolytic activity of haemolytic streptococci. The definite increase in antistreptolysin in tropical lymphangitis is evidence that acute attacks of the disease are preceded by haemolytic streptococcus infection.

C. C. Okell.

Ray (P. N.). **Some Observations on Filariasis and its Complications.**—*Calcutta Med. Jl.* 1936. Sept. Vol. 31. No. 3. pp. 121–131. With 14 figs. on 3 plates. [16 refs.]

A survey of pertinent literature with personal observations, clinical and histological.

The literature will be within the knowledge of *Bulletin* readers. In Ray's experience a culture from an acute filarial condition has been mostly negative for streptococci or other bacteria, and it would be interesting to know whether his exceptions have been early examinations. As to the cause of microfilarial periodicity " the present writer can testify to Lane's views from personal experience and observation. In every instance the female worms, alive at the operation before midday, showed the same stage of pregnancy and extreme distention with embryos." In two instances blood containing microfilariae was used in transfusion, their presence not coming to knowledge till later. None was seen when the blood of the receivers was examined by ordinary methods 2 days later.

C. L.

Romiti (Cesare). Filariasis in British Guiana. Comments on Criticisms on Previous Publications of my Research in this Disease, and Correction of Mis-Statements attributed to me.—*Brit. Guiana Med. Ann. for 1936.* pp. 54–65.

Clavier (G. Patterson). "Brevities on the Problems of Filariasis." A Resumé of the Proven Facts and Arguments on Others.—*Brit. Guiana Med. Ann. for 1936.* pp. 38–53.

Moorthy (V. N.) & Sweet (W. C.). **A Biological Method for the Control of Dracontiasis.**—*Indian Med. Gaz.* 1936. Oct. Vol. 71. No. 10. pp. 565–568. With 2 figs. & 2 maps.

Although the abolition of step wells is the only permanent and fool-proof method of control of dracontiasis, much may be done by keeping certain small fish in these wells, and this is better and cheaper than the usual chemical methods.

As the photographs in the paper show, a step well is really a considerable water reservoir, down into which it is possible, by natural or artificial steps, for a number of people to walk at the same time. In the Chitaldrug district those in the 250 villages which used them only were treated in 1 of 4 ways. A platform from which to draw water was made and the "well" itself enclosed by a parapet, new draw wells were made, the step wells were treated fortnightly from December to May, the season of transmission, with perchloron* or copper sulphate, or they were stocked with cyclops-eating fish.

These last are *Barbus* (*Puntius*) *puckelli*, *B.* (*P.*) *ticto*, *Lepidocephalocythys thermalis*, *Rasbora doniconius*, *B. sophore*, *B. chola*, and Gambusia species imported from Italy. The first of these is the only one from whose ani the guineaworm embryos do not come out; from the others the embryos emerge, weak certainly, but still alive. *L. thermalis* is a bottom feeder having among its food, eggs of and young copepods. Details of work in two villages are given. Fish were put into step wells of 35 villages; in 6 there is no longer guineaworm infection, in 4 it is much less. The details are these :—

"The first measure in routine control of guinea-worm disease by fish is the establishment of hatcheries from which the various species will be always available. In the Chitaldrug district this has been done in 73 *taluk* and *hobli* headquarters. It should also be noted that each successfully-controlled step-well can become a hatchery for the supply of fish to neighbouring villages.

"Any step-well to be stocked with fish should be previously treated with perchloron (3 lbs. to 100,000 gallons) until it is free of cyclops. Should this measure result in odour due to decaying organic matter, a small dose of potassium permanganate will remedy matters. The perchloron, if used properly, will kill many of the predaceous species of fish and leave the well free for the smaller species used in control. It is best to encourage the villagers to bail out the wells and remove silt before the treatment with perchloron is used.

"About 100 specimens of each species of fish used for control should be freed in the well about one month after the dosing with perchloron."

Then there is this curious behaviour recorded.

"The Barbus species used in control of cyclops will cluster around the submerged portions of the body of people using the step-well and pull at hairs and loose epidermis enthusiastically. This habit has been noted by the village people and it is made use of in some areas as a treatment for certain types of skin diseases and ulcers."

C. L.

* Perchloron is the name given to a bleaching powder substitute $Ca(OCl)_2$, containing 70–75 per cent. Cl, and easily soluble in cold H_2O.

MOORTHY (V. N.) & SWEET (W. C.). **Guinea-Worm Infection of Cyclops in Nature.**—*Indian Med. Gaz.* 1936. Oct. Vol. 71. No. 10. pp. 568–570.

Examinations were made of 1,874 *Mesocyclops leuckarti* and 3,279 *M. hyalinus* in nature. Of the first 1·8, and of the second 1·3 per cent. were infected.

"Cyclops naturally infected by guinea-worm larvae were found in a step-well in the Chitaldrug district of Mysore State in January and February 1936, at a time when there were in the village several cases of dracontiasis in the early stages. Although *M. leuckarti* had the higher infection rate, the actual number of *M. hyalinus* infected was greater; this was due to its numerical preponderance. No infections were found in other species of cyclops and none of the infected specimens were fully-mature females bearing ovisacs; all infections were in the younger forms of both sexes. That the naturally-infected cyclops could transmit dracontiasis was demonstrated by the finding of immature guinea-worms at autopsy of a dog which died 67 days after a feeding of 88 naturally-infected cyclops." *C. L.*

Photomicrographs of type A guinea-worm embryo with laterally placed tail, and of type B guinea-worm embryo, obtained from the same adult female worm [see p. 466].

Camera lucida drawing of type A guinea-worm embryo, having a peculiar posterior end with a laterally placed tail. (*a*) Sharp pointed, triangular projection seen in the anterior margin of the lower lip, (*b*) oesophagus, (*c*) nerve ring, (*d*) knob-like projection, (*e*) laterally placed tail, (*f*) posterior narrowed portion of the embryo.

[Reproduced from *Indian Journal of Medical Research.*]

MOORTHY (V. N.) & SWEET (W. C.). **A Peculiar Type of Guinea-Worm Embryo.**—*Indian Jl. Med. Res.* 1936. Oct. Vol. 24. No. 2. pp. 531–534. With 1 text fig. & 3 figs. on 2 plates.

A new type of guineaworm larva is described.

In 6 of 10 patients the new type of larva was seen in hundreds, those of the ordinary type in millions. Their numbers were greatest at the opening of the blister and when the part was sprayed with ethyl chloride. This is the author's description, Type A being the new, Type B the old, form.

" The type A embryo is about three-quarters the length of type B and is slightly stouter. A small triangular projection with a pointed end, resembling the small dorsal spine seen in camallanus larvae, can be seen near the anterior margin of one of the lips. Other structures seem to be much the same as those found in type B embryos and it is only at the tail-end that a decided difference exists. In type B the tail is in continuation with the body and gradually tapers to a point, whereas in type A a characteristic knob-like structure is seen projecting to one side of the

larva below which the embryo suddenly becomes very narrow. From about the middle of this narrow portion a thin tail-like structure, which ends in a sharp point, projects out laterally and is about half as long as the corresponding tail of type B. Average measurements of 20 embryos of each type, fixed and stained by the writer's method."

In these conditions the measurements, in millimetres, are those for Types A and B respectively: length 0·434 and 0·61, greatest breadth 0·023 and 0·1624, length of oesophagus 0·112 and 0·1358, anterior end to nerve ring 0·056 and 0·0672, length of tail 0·098 and 0·1582. After examination of thousands of infected cyclops one larva was seen and is held to be of Type A; it is slightly shorter than the other and its tail has what seems to be a stumpy ventral process. It is suggested that the types may be sexual. The method of staining will be published in a paper by Moorthy.

[As has been pointed out to me, the curious caudal projection of the newborn larva (which seems to be ventral, not lateral) has the appearance of a small but complete nematode larva with oesophagus and zigzag intestine.] *C. L.*

Rao (S. Sundar). **The Effect of Gastric Juice and of Bile on Cyclops infected with Guinea-Worm Larvae.**—*Indian Jl. Med. Res.* 1936. Oct. Vol. 24. No. 2. pp. 535–540.

"Cyclops infected with guinea-worm larvae are killed rapidly by hydrochloric acid even in very low concentrations; concentrations of 0·2 per cent. and higher have an immediate lethal effect on cyclops, while a concentration of 0·025 kills in 15 minutes. In all these cases the guinea-worm larvae are activated.

"Fresh gastric juice is lethal to cyclops, whatever may be its acidity concentration. Gastric juice with acid (total acids) concentrations varying between 0·15 to 0·026 per cent. kills cyclops in two minutes, much more quickly than hydrochloric acid of the same concentration. In some cases gastric juice containing no free acids whatsoever was found equally effective in killing cyclops. It appears that the combined acids in the gastric juice are as lethal to cyclops as HCl.

"Bile is lethal to cyclops, but when diluted its effect is greatly delayed. One per cent. bile has very little action on cyclops.

"The gastric juices play an important rôle in the establishment of guinea-worm infection in man by killing the cyclops and activating the guinea-worm larvae. It is not understood how bile could play any part in the above process; any cyclops that would reach the duodenum would have been already killed by the gastric juice which is lethal to cyclops even when it has a very low acid concentration." *C. L.*

Babudieri (B.). Un caso di filariasi nell'uomo, da *Filaria conjunctivae* Addario, 1885, osservato in Italia. [**A Case of Filariasis Conjunctivae in Man.**]—*Riv. di Parassit.* Rome. 1937. Jan. Vol. 1. No. 1. pp. 53–67. With 6 figs. on 1 plate. [32 refs.] English summary (6 lines).

"The A. reports all cases known up to the present of human filariasis due to *Filaria conjunctivae* Addario 1885 and adds a case observed personally in a boy at Pieris (Trieste). The A. describes the parasite and the pathological state brought about by the worm."

C. L.

DAMPF (Alphonse). Les cératopogonidés, agents transmetteurs de filaires. [**Filarial Transmission by Culicoides.**]—*Bull. Office Internat. d'Hyg. Publique.* 1936. Oct. Vol. 28. No. 10. pp. 1955–1960.

A survey of literature and a record of Dampf's own work in Mexico. The dissection, about Chiapas, of 107 *Culicoides*, apparently all of the same species, showed no microfilariae in the head, stomach or abdominal cavity, but in the thoracic muscles larvae of 2 sizes were found, one corresponding to that of *Onchocerca volvulus* and the other to that of *O. cervicalis* of the horse in England. The author is unsatisfied with the classification of the genus. Citronella is of little use in keeping the insects off, they get into the hair and creep down to the skin and, where the bite is, there the cyst may form, though the larva may travel in the body to some other spot. *C. L.*

VAN DEN BERGHE (L.). Note préliminaire sur la localisation extra-nodulaire de "Onchocerca volvulus" chez l'homme. [**Extra-nodular Localization of *O. volvulus* in Man.**]—*Ann. Soc. Belge de Méd. Trop.* 1936. Dec. 31. Vol. 16. No. 4. pp. 549–551.

In two autopsies female *O. volvulus* has been found outside nodules. It is certain that *Mf. volvulus* is got from the skin in persons in whom no nodules can be found, and that in the case of other species of the genus in animals the worms may live outside nodules. The observation of Dyce SHARP of the escape of an adult worm from an abscess of the foot is noted, but it is felt that it might have come from a nodule broken down by suppuration. Then two instances are given in which after a minute search at autopsy, worms were found unenclosed in fibrous nodules.

The first, a person of 60, had three nodules about the left and one about the right trochanter, one on the right iliac crest and in addition a coiled up female worm was present in the fatty tissue about the right trochanter, but with no surrounding fibrosis. The second, a person of 25, had three nodules over the right ribs, one on the right iliac crest and one over the left trochanter. A female worm, not rolled up and with no capsule, was found in dense connective tissue about the left trochanter. A lens is needed in such investigations. This preliminary note is written because the find must modify hypotheses hitherto held, and certain conceptions on the pathogenesis and treatment of this infection. [It is but just to quote from Dyce SHARP (see this *Bulletin*, 1926, Vol. 23, p. 761). Speaking of 100 unselected prisoners at Kaduna, Nigeria, he noted "the presence of embryos of *O. volvulus* in the skin of 55 . . . . Of these 55, only 17 or 30 per cent. exhibited parasitic tumours, and that after prolonged and careful search . . . No one has yet described the finding of these peculiar tumours in the deeper tissues . . . . The existence of human onchocerciasis in the absence of tumour formation is not yet admitted by so great an authority as Professor BRUMPT . . . . Only by finding the adult filaria at an autopsy on a carrier can this point be definitely cleared up." They are now reported (unenclosed by the action of the host's reticulo-endothelial system) eleven years later. The lag is not unusually long for Tropical Medicine.] *C. L.*

Africa (Candido M.) & Garcia (Eusebio Y.). **A New Nematode Parasite (*Cheilospirura* sp.) of the Eye of Man in the Philippines.**—*Jl. Philippine Islands Med. Assoc.* 1936. Oct. Vol. 16. No. 10. pp. 603–607. With 3 plates.

The worm was placed in the genus *Cheilospirura* after examination of two portions broken off from the mass in which it lay in the conjunctiva, and from sections of part of that mass.

A man of 70 had conjunctivitis 7 months after waking one night and expressing dark mudlike material from the right eye. When seen he had a tumour inside the lower lid, size 1 × 0·8 cm. with 4 small openings at one end and two whitish threadlike objects 0·2 mm. wide and about 5 mm. long projecting from the other. These were pulled off and part of the tumour cut out. One was of a head end whose description is not understood, but which speaks of " a dorsal and a ventral pair of double, cuticular cordons originating from the base of the lips " and which seemed to go far back, since they were seen in the second fragment which " appears to have been taken from the middle portion of the body, or at least beyond the oesophageal region." Of the eggs seen free in sections of the tumour only a few were embryonated, they were thick-shelled and measured 28 by 18μ.

C. L.

Palazzo (Marco Quinto). Uretrorragia da infestazione di *Limnatis nilotica* osservata in un indigeno della Cirenaica. [**Urethral Haemorrhage due to *Limnatis nilotica*.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1936. Dec. Vol. 17. No. 12. pp. 745–750. With 2 figs. & 1 map.

The patient was a man of 70 years, a native of Bengari, suffering from haematuria. On examination an elongated brownish coloured body was seen a few millimetres from the meatus, resembling a blood clot. It clung to the wall, but was finally removed ; it proved to be one of the Hirudines, *Limnatus nilotica*, and when fully extended measured 7–8 cm., when retracted 1–1·5 cm. A successful treatment is by irrigation with 2 per cent. acetic acid ; equally efficacious is Dujardin-Beaumetz solution, 1 in 4. (This contains carbon bisulphide 25 parts, essence of mint 2 parts, distilled water 500 parts.) The patient had acquired the leech when bathing in a neighbouring spring.

H. H. S.

Noronha (A. J.). A Nematode Worm passed in the Stools by a Patient suffering from an Irregular Pyrexia of Obscure Origin.—*Jl. Trop. Med. & Hyg.* 1937. Jan. 1. Vol. 40. No. 1. pp. 1–4. With 7 figs. & 1 chart.

THE TYPHUS GROUP OF FEVERS.

Le Chuiton. Les principales fièvres exanthématiques groupées selon leurs particularités épidémiologiques. [**Epidemiological Classification of Typhus Fevers.**]—*Arch. Méd. et Pharm. Nav.* 1936. Apr.–May–June. Vol. 126. No. 2. pp. 233–272.

The various members of the typhus group of diseases are discussed and the classification of Nicolle is adopted : the 2 main groups are—

Group A. The vectors are insects—lice and fleas.

(1) Epidemic and endemic typhus. *X19* is the main agglutinin.

Group B. The vectors are arthropods—ticks and mites.

(1) Rocky Mountain fever.
(2) *Boutonneuse* fever.
(3) Japanese River fever.

X19 group agglutinins in some, *XK* in others.

This classification is roughly in agreement with that of Pinkerton [see this *Bulletin*, 1936, Vol. 33, p. 907] although arrived at by different methods. Each member of the groups is then discussed as regards aetiology, transmission, clinical features, prophylaxis, vaccination, etc., special consideration being given to endemic typhus, which the writer of the paper has investigated on board the French men-of-war in Toulon Harbour. It is specially noted that endemic or murine typhus occurs among members of the ship's company who live on board the vessels in the harbour and these men do not contract *boutonneuse* fever, whereas other people who live on shore contract *boutonneuse* fever and do not get endemic typhus. *D. Harvey.*

Balozet (M. L.). Rickettsies et Rickettsioses. [**Rickettsia and Rickettsial Infections.**]—*Rev. Gén. de Méd. Vét.* 1936. July 15. Vol. 45. No. 535. pp. 385–408. With 3 figs.

A very complete review of the subject of the Rickettsia of man, arthropods and animals.

The subject is considered under morphology, culture, filterability, immunity, etc.

The Rickettsioses are grouped as follows—

(1) Typhus, paratyphus group.
(2) Japanese River fever group.
(3) Rocky Mountain fever group.
(4) Heart water group.
(5) Trachoma, etc.

An excellent table is given showing the disease, vector, distribution, etc. *D. H.*

Hass (George M.) & Pinkerton (Henry). **Spotted Fever. II. An Experimental Study of Fièvre Boutonneuse.**—*Jl. Experim. Med.* 1936. Oct. 1. Vol. 64. No. 4. pp. 601–623. With 8 figs. on 3 plates. [20 refs.]

In a previous paper [this *Bulletin*, 1936, Vol. 33, p. 907] Pinkerton has postulated certain differential criteria which are necessary for the accurate classification of the typhus fevers ; as a result of these studies the author divides the Rickettsial diseases into 2 genera : (1) *R. prowazeki* typhus, (2) *R. rickettsi*, or *Dermacentroxenus rickettsi*, spotted fever.

In the present paper these criteria are now applied to the virus of *boutonneuse* fever and this virus is classified in the second genus as a sub-species.

Criteria for classification.

1. Clinical course in man ; mild cases of spotted fever cannot be differentiated from *boutonneuse* fever but in the latter disease a primary sore and adenitis are nearly always present.

2. Weil-Felix reaction ; *boutonneuse* fever and spotted fever both give a modified or group reaction for *OX19* and do not agglutinate *OXK*.

3. Clinical course in guineapigs ; the mortality is much greater in spotted fever, but in both cases scrotal reaction is present.

4. Study of smears of scrotal sac exudate in guineapigs.

In guineapigs infected with *boutonneuse* fever virus Rickettsia which are similar in morphology to the Rickettsia of spotted fever are found in small numbers in the cytoplasm of the cells and also in some instances in the nuclei.

5. Histopathology in man and animals.

In the guineapig a condition of thrombo-angeitis with necrosis is found in the tunica of animals infected with *boutonneuse* fever virus ; this agrees with the findings in spotted fever and differs from typhus fever.

6. In sections of tissues from infected guineapigs Rickettsia could also be detected in the nuclei of the cells.

As no fatal cases of *boutonneuse* fever were met with it was not possible to compare the conditions with those found in spotted fever in man.

7. Crossed immunity.

The blood from guineapigs dying of spotted fever was injected into 6 guineapigs which had recovered from *boutonneuse* fever, none of the 6 reacted, all were immune. It was interesting to note, however, that spotted fever tick vaccine does not protect guineapigs from *boutonneuse* fever virus although it does protect against the homologous virus.

8. Study of the micro-organism in the arthropod vector.

In ticks infected with the virus of *boutonneuse* fever the Rickettsia were seen in the nuclei of the cells in 4 instances ; also the micro-organisms were noted throughout the viscera of the tick exactly as is the case in spotted fever.

9. Tissue culture of virus.

Here also the Rickettsia of *boutonneuse* fever virus were found in small numbers in the cytoplasm of the cells and also within the nuclei.

The conclusions are that the Rickettsia of *boutonneuse* fever resemble those of spotted fever in morphology, they invade the same type of cell, they do not fill up the cytoplasm of the cells but may be found in the nuclei of the cells, and the distribution in the tick is the same.

D. H.

Bush (F. Keith). **Typhus Fever in the Simla Hills.**—*Jl. Roy. Army Med. Corps.* 1936. Sept. Vol. 67. No. 3. pp. 158–172. With 6 charts.

In the Simla hills in 1932 there were 5 cases of typhus with 2 deaths, in 1933, 14 cases with 1 death, in 1934, 15 cases with no deaths. The

6 cases which occurred in 1935 are described in this paper. Temperature charts and the serological results are included. The cases occurred, as in previous years, towards the end of the rainy season. Graphic accounts of the early stages of their illness are given in their own words by 3 of the soldiers.

Headache was the prominent symptom in all the cases, usually accompanied by pain on movement of the eyes. Insomnia was noted in all cases. The fever lasted for 15 to 21 days and terminated by lysis. Rigors, double and repeated, were an early, marked and constant feature. The rash was not a striking symptom and was noticed in only 3 out of the 6 cases.

Positive agglutination with *Proteus OXK* was obtained in all the 6 cases. In 3 cases *OX19* and *OX2* were also agglutinated.

In one case a small boil or ulcer was noted on the leg with inflamed lymphatics and enlarged and painful glands, probably a primary sore ; in no case was any tick or mite discovered. *D. H.*

COVELL (G.) & MEHTA (D. R.). **Studies on Typhus in the Simla Hills. Part VI. The Rôle of the Human Body-Louse in the Transmission of Typhus.**—*Indian Jl. Med. Res.* 1936. Oct. Vol. 24. No. 2. pp. 389–397. With 3 charts & 1 plate. [10 refs.]

A monkey was inoculated with a local strain of murine typhus, lice were fed on this monkey ; of 60 of these lice which were dissected 3 showed enormous numbers of Rickettsia in the gut, *i.e.*, 5 per cent.

The remaining lice which had fed on this monkey were then fed on a clean monkey. This monkey developed fever later and the Weil-Felix reaction, which had been negative, became slightly positive. Blood was taken from this monkey during the fever and inoculated into guineapigs ; they also developed slight fever but none showed any scrotal reaction.

Some of the lice were crushed and rubbed into the scarified skin of another monkey, this animal also developed fever and so also did guineapigs inoculated with the blood, but none showed any scrotal reaction ; this particular strain of murine virus gave, as a rule, a marked scrotal reaction in guineapigs. *D. H.*

LEWTHWAITE (R.), HODGKIN (E. P.) & SAVOOR (S. R.). **The Typhus Group of Diseases in Malaya. Part VI : The Search for Carriers.**—*Brit. Jl. Experim. Path.* 1936. Aug. Vol. 17. No. 4. pp. 309–317.

A stock of laboratory bred *X. cheopis* was obtained and batches of these "clean" fleas were used in experiments with the viruses of urban and rural typhus. White rats were inoculated with the virus of urban typhus and fleas were fed on them for 15 days, some of these fleas were then taken and emulsified and injected into 4 guineapigs, all 4 became infected. Rickettsia were found in the fleas in large numbers. Thirty-eight fleas were taken from the box in which they had fed on the infected rat and were placed in a clean box into which 2 white rats were put ; these rats were killed after an interval and the brains proved to be infective. The infected guineapigs were later tested with the virus of urban typhus and were immune. The whole experiment was repeated, with the same result. Similar experiments were carried out with rat fleas with the virus of rural typhus ; all

were negative. In a footnote it is stated that in further trials there was some evidence of infection. Fleas infected with the virus of urban typhus produced infection when rubbed into the scarified skin of guineapigs ; so did the *faeces* of the same fleas.

Ticks in urban and rural typhus.—The ticks employed were *Dermacentor andersoni* and *Rhipicephalus sanguineus.* These were fed on guineapigs infected with the virus and subsequently on clean guineapigs ; there was no evidence of infection. Two hundred ticks were used. *D. H.*

LEWTHWAITE (R.) & SAVOOR (S. R.). **The Typhus Group of Diseases in Malaya. Part VII : The Relation of Rural Typhus to the Tsutsugamushi Disease (with Special Reference to Cross-Immunity Tests).**—*Brit. Jl. Experim. Path.* 1936. Dec. Vol. 17. No. 6. pp. 448–460. [22 refs.]

In the early days when scrub typhus and urban typhus were first detected in Malaya, it was shown on serological and epidemiological grounds that the diseases were distinct and separate. It was also considered that scrub typhus and tsutsugamushi fever, as it occurred in Malaya, were separate and distinct and this for two main reasons : (*a*) in scrub typhus there was no primary sore at the site of the infecting bite, (*b*) cases of scrub typhus gave a higher titre of agglutination for *OXK* than did cases of tsutsugamushi fever ; however, further experience has shown that the latter observation is not reliable, therefore the only difference still remaining between these diseases is the presence or absence of a primary sore. It has been demonstrated that the causal organisms in scrub typhus and tsutsugamushi fever are Rickettsia and they are identical in morphology, in numbers, distribution and staining characteristics. Guineapigs, rabbits and monkeys are all susceptible to the two viruses and the reactions in these animals are similar. The most important reaction from this point of view is the reaction in the eye of the rabbit and the production of an initial lesion in the skin in the rabbit and monkey when the virus is injected intradermally. Also, the results of the Weil-Felix reaction in the sera of rabbits inoculated with the viruses of scrub typhus and tsutsugamushi fever are the same.

In the present paper this research is carried a stage further and the results of an elaborate series of cross immunity experiments are recorded.

In brief, it may be stated that these experiments show that there is definite and complete cross immunity between the viruses of scrub typhus and tsutsugamushi fever both by the intraocular and intradermal reaction in rabbits and monkeys and by the Weil-Felix reaction in rabbits.

Rabbits inoculated with either virus gave a positive reaction for *OXK* and when inoculated later, either with the homologous or heterologous virus, there was no stimulation of the agglutinins for *OXK*.

In discussing the results of their researches the authors consider that scrub typhus and tsutsugamushi fever are identical in all known features of aetiology, epidemiology, serology and experimental infection of laboratory animals, the clinical symptoms in man are also the same except for the occurrence of the primary sore in the tsutsugamushi cases. The results of the successful cross immunity experiments recorded in this paper add a further and conclusive addition to

the evidence of identity. The authors ask, is this single clinical feature, the presence or absence of a primary ulcer, enough to separate the two diseases? The answer is in the negative; they consider scrub typhus and tsutsugamushi fever to be one and the same disease, and the name scrub typhus might be dropped.

It has been suggested that the presence or absence of a primary sore may depend on whether the bite is intradermal or subcutaneous: in the one case a mite might be the vector, in the other the tick. The authors consider that such a supposition is unnecessary, the true explanation being that in some cases of the fever the primary sore is so small and fleeting that it is not noted and this is especially the case in the dark and thick skinned native of India or Malaya.

An instance is quoted of an outbreak of fever in one estate where 4 out of the 6 Europeans employed developed typhus and all showed a primary sore. At the same time and place two hundred native workers developed a similar fever, but in only one case was a primary sore detected. Also in one fatal case, in a European, a small red papule was noted on the neck, the glands in the neck became swollen and later the glands in the axilla and groin of the same side, followed later by swelling of the glands on the other side of the body, the papule had completely disappeared in a day or two and there was no sign of necrosis. In some cases of so-called scrub typhus no ulcer is detected, but involvement of lymphatic glands (bubo) is well marked; whereas in cases diagnosed tsutsugamushi fever there may be a well marked primary ulcer but little or no involvement of the lymphatic glands. In short, the authors conclude that scrub typhus is tsutsugamushi fever without a primary ulcer or in which the primary ulcer has not been detected.

D. H.

LEWTHWAITE (R.) & SAVOOR (S. R.). **The Typhus Group of Diseases in Malaya. Part VIII: The Relation of the Tsutsugamushi Disease (including Rural Typhus) to Urban Typhus. Part IX: The Relation of the Tsutsugamushi Disease (including Rural Typhus) and Urban Typhus to Rocky Mountain Spotted Fever. (With Special Reference to Cross-Immunity Tests.)**—*Brit. Jl. Experim. Path.* 1936. Dec. Vol. 17. No. 6. pp. 461–472. [15 refs.]

The authors have already shown that the Rickettsia of urban typhus resemble *R. prowazeki* and the Rickettsia of tsutsugamushi fever (Malaya) resemble *R. orientalis*.

The diseases also differ in epidemiology and in clinical features. Urban typhus occurs in towns, especially in grain shops, and is almost certainly carried from rats to man by the rat flea, whereas tsutsugamushi fever occurs in the plantations and is carried by a larval mite. Clinically the diseases are somewhat similar, but there is never a primary ulcer in urban typhus and fatal cases are seldom met with. As regards experiments in laboratory animals the virus of urban typhus is readily inoculable to guineapigs and produces a scrotal reaction in the male, but not ascites. On the other hand, it is difficult to infect guineapigs with the virus of tsutsugamushi fever, scrotal reaction does not occur but ascites is constant.

In the rabbit the virus of urban typhus produces only a slight and transient reaction in the eye, but gives a positive Weil-Felix reaction for *Proteus OX19*. On the other hand the virus of tsutsugamushi

fever produces a marked reaction in the eye of rabbits and the Weil-Felix reaction is positive for *OXK*. In monkeys also urban typhus virus gives a positive Weil-Felix reaction for *OX19* and when inoculated intradermally there is no papule, whereas the virus of tsutsugamushi fever gives a positive reaction for *OXK* and produces a primary sore in the skin of the monkey.

In the present paper the results of cross immunity experiments are recorded and it is shown that there is no evidence of cross immunity between the viruses of urban typhus and tsutsugamushi fever. The two diseases are separate and distinct.

A further series of cross immunity experiments were carried out between the viruses of (*a*) spotted fever and tsutsugamushi fever (*b*) spotted fever and urban typhus. There was no evidence of cross immunity in the case of spotted fever and tsutsugamushi disease. But although there was no evidence of immunity in guineapigs which had been inoculated with urban typhus when subsequently inoculated with the virus of spotted fever, there was distinct evidence that animals which had recovered from infection with the virus of spotted fever had a degree of immunity to infection with the virus of urban typhus.

Spotted fever tick vaccine gave no protection against the viruses of urban typhus or tsutsugamushi fever, although it protected the animals against the homologous virus. *D. H.*

Subrahmanyam (C.). **Tropical Typhus in Singapore.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. July 31. Vol. 30. No. 2. pp. 263–268. With 6 charts.

In Singapore General Hospital 1 case of typhus was reported in 1932, 2 in 1933, and 5 in 1934.

In 1935 all sera sent to the laboratory in the hospital were tested for the Weil-Felix reaction. Of 1,209 bloods tested 46 gave a positive reaction, 30 for the W variety, and 16 for the K. All these cases of fever were contracted in the city and it is obvious that typhus fever, both of the W and K variety, is endemic in Singapore (urban and rural). [It would be more correct to say that endemic typhus and Malayan tsutsugamushi fever are present in Singapore.] Several strains of *Proteus* were isolated from the urine of the cases. *D. H.*

Beveridge (A. J.) & Underhill (E.). **Notes on a Case of Japanese River Fever (Tsutsugamushi Disease) and a Case of Tropical Typhus Fever.** *Jl. Roy. Army Med. Corps.* 1936. Dec. Vol. 67. No. 6. pp. 400–405. With 1 chart.

A case of fever in a soldier aged 26 in Singapore is described ; on admission a small ulcer was noted on the left ankle and enlarged glands could be felt in the left groin ; a dusky red macular rash was a prominent symptom ; the patient died on the 18th day of the illness.

The Weil-Felix reaction was positive 1/250 for *Proteus OXK* and negative for *OX19*.

Another case of fever of the typhus group is described by one of the writers, this case was seen some years previously in India. The fever lasted 18 days and a profuse dusky red macular rash similar to that in the previous case was noted. The Weil-Felix reaction for *X19* was positive 1/250 ; there was no primary sore. *D. H.*

KLIGLER (I. J.) & COMAROFF (R.). **An Epidemic Outbreak of Murine Typhus in a Labour Group in an Inland Village in Palestine.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. Nov. 28. Vol. 30. No. 3. pp. 363–368.

It has already been noted that the so-called epidemic virus of typhus may give rise to sporadic or endemic cases. In the present paper it is shown that the endemic virus may give rise to explosive outbreaks.

Typhus fever broke out in a small farm colony of 58 workers: in six weeks there were 43 cases, an incidence of 74 per cent. Eighty-four per cent. of the men were attacked and 64 per cent. of the women. The place was infested with rats and a murine typhus virus was readily isolated from the rats and also, but with difficulty, from fleas taken from the rats. The fever was mild in all the cases, there were no toxic symptoms and no fatalities. The Weil-Felix reaction for *Proteus OX19* was positive in all the cases. No lice could be discovered on any of the workers. *D. H.*

BERRI (Nicolò). Sulla febbre esantematica del litorale mediterraneo. (Studio clinico.)—*Ann. di Med. Nav. e Colon.* 1936. Sept.–Oct. 42nd Year. Vol. 2. No. 3–4. pp. 155–162. With 1 fig. [23 refs.]

GEAR (J. H. S.) & BEVAN (C.). **An Outbreak of Tick-Bite Fever.**—*South African Med. Jl.* 1936. July 11. Vol. 10. No. 13. pp. 485–488. With 1 fig. [16 refs.]

Twelve cases of typhus were investigated; all these people lived in the city of Johannesburg or in the suburbs, and none had been away from home for at least a month before the fever commenced. Two cases occurred in one family but the remainder of the cases were scattered and had no connexion with one another. The cases were clinically definite typhus and were all severe, intense headache was a predominant symptom and delirium occurred in every case. The maculo-papular rash was profuse and involved the palms and soles, fever lasted 10 to 14 days and thrombosis was noted in 2 cases. The Weil-Felix reaction became positive late in the fever and the maximum titre was obtained after the fever had ceased. *Proteus OX19* was agglutinated in high titre up to 1/3000 and *OX2* at 1/400. *OXK* was only agglutinated to 1/50 and only in one case. A primary sore and enlarged glands were noted in half of the cases only. Lice and rat fleas could be excluded, but all the patients were devoted to dogs and were in the habit of removing ticks from their dogs and crushing them with the fingers.

It is suggested that, as occurs in *boutonneuse* fever, the cases in which a primary sore could not be detected may have been infected through the conjunctiva or through an abrasion or cut on the skin.

This paper is of importance as it demonstrates that there is in South Africa still another type of typhus fever distinct from the very mild type of "tick bite fever" with constant primary sore and bubo described by PIJPER and his co-workers and which they have shown can be carried by larval ticks which live on veld rodents. These cases described by Gear resemble closely the cases originally described in South Africa by MCNAUGHT in 1911.] *D. H.*

Gordon (R. M.) & Davey (T. H.). **The Occurrence of Tropical Typhus in Sierra Leone: a Preliminary Report.**—*Ann Trop. Med. & Parasit.* 1936. July 17. Vol. 30. No. 2. pp. 203–209. With 1 map & 1 chart. [16 refs.]

Since May 1935 all sera sent to the laboratory in Sierra Leone have been tested for the Weil-Felix reaction. The sera of 45 cases of fever of unknown origin were tested more than once and of these 5 gave reactions of 1/100 and above for *Proteus OX19* and *OX2*. Three of these cases were clinically and serologically definite cases of typhus; short clinical accounts are given of these 3 cases, no rash could be detected in any of them. In one case a titre of 1/3000 for *OX19* was reached and in another the highest titre was 1/6400; all were negative for *OXK*. The onset was abrupt and the fever lasted 10 to 14 days.

So far as the writers and the reviewer are aware these are the first cases of typhus to be reported as such, Weil-Felix reaction positive, in West Africa and it is hoped that medical officers in other areas will be on the outlook for further cases. *D. H.*

Fontoura de Sequeira (Luiz A.). Quelques considérations sur un cas de fièvre exanthématique de la Guinée Portugaise. [**Typhus Fever in Portuguese West Africa.**]—*Rev. Méd. et Hyg. Trop.* 1936. July–Aug. Vol. 28. No. 4. pp. 210–217. With 1 fig. & 1 chart.

The author while in bush country in Portuguese West Africa on trypanosome investigation contracted fever and gives an account of his case.

He refers at length to the Report of the Public Health Department of Mozambique published in the year 1908 in Lorenço Marques in which Professor Santana describes a typhus-like fever. Santana records that the fever resulted from the bite of ticks, these bites gave rise to primary sores (ulcers with adenitis) and were followed some days later by fever, accompanied in some instances by a definite maculo-papular rash; the ticks collected from the cases were *Amblyomma* and *Rhipicephalus*. This work preceded by some years the work of Nuttall and others. In the author's own case he notes that while in the bush he suffered from several small itchy papules but could find neither ticks nor mites on the skin. About a week after his return from the bush he developed fever and discovered an initial sore in the axilla with enlarged glands. The fever lasted 10 days and on the 5th day a maculo-papular rash was noted on the face. Headache and insomnia were the troublesome symptoms. As regards the vector in his case the author notes that a month or two after his illness he was again in the bush country and again felt the same itchy sores on his legs. On examination of these he found one or two larval mites and also obtained several similar mites from the grass. It is hoped to have these mites identified later. Ticks (*R. sanguineus*) were also numerous in the neighbourhood. *D. H.*

Pergher (G.). Recherches expérimentales sur l'épidémie du typhus exanthématique de l'Urundi. [**Investigation of the Virus of Exanthematic Typhus in Urundi.**]—*Ann. Soc. Belge de Méd. Trop.* 1936. June 30. Vol. 16. No. 2. pp. 227–251. With 6 figs.

The virus investigated was isolated from cases of typhus fever and also from lice fed on these cases.

There is nothing new regarding the virus but the paper clearly demonstrates that the virus was an epidemic or historic virus and that the disease was conveyed by lice. One interesting point in regard to this epidemic was that a rash was only observed in less than 1 per cent. of the cases and even in these was only slight and evanescent. In 3 European cases the rash occurred in one only. In the laboratory investigations of the virus only guineapigs were used as white rats were not available, but the virus was sent to Belgium and was there inoculated into rats and produced only an inapparent infection. The virus was isolated, by inoculation of blood into guineapigs, from 6 cases but only 2 were fully investigated. Fever resulted in all guineapigs but true orchitis was not seen in any nor could Rickettsia be found in the tunica. Three strains of virus were obtained from lice : (*a*) lice from cases of fever, (*b*) lice from contacts, and (*c*) normal lice fed on cases. All three infected guineapigs ; these viruses from lice were more virulent than the virus from the blood of cases.

Crossed immunity experiments were carried out and it was found that all the local strains protected against one another, human *v.* human, louse *v.* louse and louse *v.* human. Also there was cross immunity with the Urundi virus and a European murine typhus virus. It was also noted that this virus had a strong affinity for the nervous system of the experimental animals. The brain was infective early and contained more virus than the blood—further proof that the virus was a true typhus virus and not a murine virus. Some thousands of lice were collected from healthy natives of the locality where typhus had occurred 4 months previously and 2,000 were emulsified in batches of 500 and inoculated into guineapigs, but without any result. Rats and mice collected from the same area were also tested but no infection was noted. *D. H.*

Hinman (E. Harold). **History of Typhus Fever in Louisiana.**—*Amer. Jl. Public Health.* 1936. Nov. Vol. 26. No. 11. pp. 1117–1124.

The author records the occurrence of epidemics of typhus fever in New Orleans from the year 1844 to 1860 ; the infection was introduced by immigrants from Europe especially from Ireland and by disbanded United States soldiers returning from Mexico and the disease was largely confined to these people and did not spread to the local inhabitants. During this period of 16 years there were nearly 3,000 deaths. The interesting point is that during the years 1864–1880 following the Civil War and the blockade of the city only 104 deaths from typhus were reported. Endemic typhus was not recognized in Louisiana till 1929 and since that time 46 cases have been diagnosed. These cases all occurred among people, natives of the State and who had been long resident there, and there was evidence that the cases were associated with rat prevalence. *D. H.*

Almazan (L. Andreu). Le typhus au Mexique de 1925 à 1935. [**Typhus Fever in Mexico, 1925–1935.**]—*Bull. Office Internat. d'Hyg. Publique.* 1936. Nov. Vol. 28. No. 11. pp. 2138–2141. With 2 charts.

During the period under review typhus fever has increased in Mexico. In 1929 in the district under the test there were only 150

cases with 28 deaths reported, whereas in 1935 in 6 months there were 750 cases with 332 deaths. Numerous vaccinations were carried out in 1933–1935 with the Zinsser vaccine and contacts were given a dose of antityphus horse serum; but the numbers who could be treated in this manner were too few to have any effect on the incidence of the disease. *D. H.*

Violle (H.). Contribution à l'étude des virus du typhus murin. [**Contribution to the Study of Murine Typhus Virus.**]—*Bull. Acad. Méd.* 1936. July 23. 100th Year. 3rd Ser. Vol. 115. No. 28. pp. 143–146. With 2 figs.

A case of mild typhus fever which occurred in Marseilles is described. There were no dogs in the house of the patient but the place was overrun by rats. The blood from the case was inoculated into 2 rats and 2 guineapigs; both rats developed fever but there was only slight fever in the guineapigs. The virus was passaged in rats, emulsion of brain was inoculated intraperitoneally, the virulence was much enhanced by this method and high fever resulted both in rats and guineapigs with orchitis in the latter.

The author considers that this virus is similar to the virus of ship typhus at Toulon, *i.e.* an endemic typhus virus not *boutonneuse* virus. *D. H.*

Kemp (Hardy A.). **Failure to establish the Virus of Endemic Typhus in Rats by feeding them Infected Guinea Pig Tissue.**—*Amer. Jl. Trop. Med.* 1936. July. Vol. 16. No. 4. pp. 479–480.

White rats were fed on tunica of infected guineapigs and were killed at intervals of 1 week, 10 days, 2 weeks, 3 weeks and 4 weeks thereafter. Two rats were killed at each period of time and emulsion of the brains inoculated into guineapigs. There was no fever in any of the guineapigs and none was immune when tested later. *D. H.*

Le Chuiton (F.), Berge (Ch.) & Pennanéac'h (J.). Action du vieillissement sur le virus du typhus murin (souche Toulonaise P. F. X.). Possibilité de la transmission de la maladie du rat à l'homme par la voie digestive. [**Effect of Ageing on the Virus of Murine Typhus. Transmission from Rat to Man by the Alimentary Route.**]—*Bull. Soc. Path. Exot.* 1936. Oct. 14. Vol. 29. No. 8. pp. 835–839.

An emulsion of the brain of a guineapig infected with the murine typhus of Toulon was added to 2 cc. of the blood of the same animal. The mixture was kept in the dark for 10 days and was tested, by injection into rats and guineapigs, at intervals of 2 days, 4 days, 6 days and 10 days; some of the mixture was also given to other normal animals by the mouth.

The mixture was infective after 2 days; after 4 days there was some doubtful evidence of infection, i.e., slight fever and immunity. At 10 days there was no sign of infection.

The authors suggest the possibility of infection of man by means of food soiled by the infective urine of rats, as the virus may remain infective for 3 or 4 days at least. *D. H.*

Brumpt (E.). Longue conservation de 28 mois du virus du typhus de São Paulo chez l'argasiné *Ornithodorus turicata*. Non transmission par la piqure de cet acarien. [**Conservation of the São Paulo Virus in** *O. turicata*.]—*Ann. Parasit. Humaine et Comparée.* 1936. Nov. 1. Vol. 14. No. 6. pp. 621–628.

——. Le virus de la fièvre pourprée des Montagnes Rocheuses peut se conserver plus de 600 jours dans le corps de l'*Ornithodorus turicata*, mais n'est pas transmis par la piqure de cet acarien. [**Conservation of Rocky Mountain Fever Virus in** *O. turicata*.]—*Ibid.* pp. 629–631.

Brumpt by means of a series of experiments carried out over a period of years has found that the virus of São Paulo typhus is viable in the soft tick *O. turicata* for a period of more than two years and that the virus of Rocky Mountain fever in the same tick is viable for a period of 620 days.

In view of the risks incurred (Professor Brumpt contracted the disease in the course of these experiments) in dealing with these dangerous viruses Brumpt recommends the method of conserving the virus in the tick as being less risky than constant reinoculation of guineapigs by means of heart blood injections. *D. H.*

Fejgin (Bronislawa). Sur la persistance du virus du typhus exanthématique dans les poux. [**Persistence of Typhus Virus in Lice.**]—*C. R. Soc. Biol.* 1936. Vol. 123. No. 26. pp. 37–39.

A dozen infected lice were received in August 1932 by the writer from Professor Weigl's laboratory at Lwow. As the virus was not required at the time the lice, in a glass tube inside a wooden box, were placed in the refrigerator at a temperature of + 4°C.

In November 1934 the dried lice and some of their excreta were removed from the tube and emulsified and injected into guineapigs, these became infected and the virus was passaged. Rabbits subinoculated from the guineapigs were also infected and their sera gave a positive Weil-Felix reaction. The tissues of the guineapigs were proved to be sterile on ordinary media except that on one occasion a *Proteus X* bacillus was isolated.

Thus the virus had remained alive in the lice and excreta for at least 27 months. *D. H.*

Ragiot (Ch.) & Delbove (P.). Trois cas de manifestations nerveuses au cours des fièvres typho-exanthématiques observées en Cochinchine. [**Nervous Symptoms in Exanthematic Typhus.**]—*Bull Soc. Path. Exot.* 1936. Oct. 14. Vol. 29. No. 8. pp. 839–844.

Three cases of typhus fever in which there was involvement of the cerebrospinal and the central nervous system are described.

In the first case, which proved fatal, there was paralysis of both lower limbs and paresis of the right arm. The Weil-Felix reaction was positive for *Proteus OX19* in 1/1000.

In the second case the patient was comatose on admission and remained so for several days. There was a positive Babinski sign and other reflexes were abolished; the Weil-Felix reaction was positive for *X19* 1/500.

In the third case there was paralysis of both upper and lower limbs and reflexes were abolished in this case also. *D. H.*

Lewis (B. S.). **An Anomalous Case of Typhus.**—*Jl. Roy. Nav. Med. Serv.* 1936. Oct. Vol. 22. No. 4. pp. 345–346. With 1 chart.

A case of typhus seen in Hankow.

A marked symptom in this case was severe abdominal pain with vomiting, there was no rash at any time, the patient was mentally confused and had no recollection of his 14 days of fever. The Weil-Felix reaction was strongly positive. *D. H.*

Serefettin (Osman). Die verschiedenen Formen des Fleckfiebers in der Türkei. [**The Various Types of Typhus Fever in Turkey.**] —*Deut. Med. Woch.* 1936. Aug. 14. Vol. 62. No. 33. pp. 1334–1335.

The author has encountered three distinct types of typhus fever in Turkey : (*a*) sporadic cases of historic louse borne typhus ; (*b*) a few cases of *boutonneuse* fever ; (*c*) cases of endemic typhus carried by the rat flea, from rats which were found to be infected with the virus.

D. H.

Boudin (Georges) & Rambert (P.). Un nouveau cas de fièvre boutonneuse observé à Paris. [**Another Case of** *Boutonneuse* **Fever in Paris.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1936. Nov. 23. 52nd Year. 3rd Ser. No. 31. pp. 1497–1500.

Some 2 years ago a case of *boutonneuse* fever was described in Paris ; in the present paper a second case is described. The patient, a small boy of 6 years of age, had only arrived in Paris from the south of France a week before he became ill, so that this case did not originate in Paris nor did the previous case.

There was a profuse rash of the true " button " character and a definite " tache noire " was detected above the right breast, the glands in the axilla were enlarged and small painful glands were also felt in the neck, part of a general micro-adenitis. Although there was no typhoid state, there was evidence of irritation of the meninges, *i.e.*, violent headache, stiffness of the neck, Kernig's sign and pain and tenderness in the limbs. The Weil-Felix reaction was negative, the fever lasted 16 days and the primary sore disappeared in 10 days. The patient had been in close contact with tick infested dogs in his home in the country. *D. H.*

Augier (Pierre) & Durandy (Paul). Les manifestations nerveuses au cours de la fièvre boutonneuse méditerranéenne. [**Nervous Symptoms in** *Boutonneuse* **Fever.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1936. Nov. 30. 52nd Year. 3rd Ser. No. 32. pp. 1545–1553.

In 8 cases of *boutonneuse* fever observed by the authors in hospital in Nice, 7 showed definite involvement of the central nervous system, an encephalitis. The symptoms noted were violent headache, insomnia, pains in limbs, muscles and joints, rigidity especially of the upper limbs accompanied by contractions, exaggerated reflexes, and cramps in limbs (see paper by Boudin & Rambert above). *D. H.*

PLAZY (L.). Les phlébites dans la fièvre boutonneuse. [**Phlebitis in *Boutonneuse* Fever.**]—*Bull. Soc. Path. Exot.* 1936. July 8. Vol. 29. No. 7. p. 703.

In 1933 the author published an account of a case of *boutonneuse* fever which was complicated by phlebitis in the left leg, this complication appeared on the 17th day of the disease. The author has never seen phlebitis in any of his cases of endemic typhus.

D. H.

LOEWENTHAL (L. J. A.). **A Note on Tick-Typhus in the Eastern Province of Uganda.**—*East African Med. Jl.* 1936. Aug. Vol. 13. No. 5. pp. 141–145. [10 refs.]

A vivid account of a personal experience.

The author's duty entailed walking through tick-infested grass; in the evening when removing ticks from the person the head of one remained in the skin of the groin. Four days later an ulcer developed at this site followed by lymphangitis and enlarged lymph glands, a typical "tache noire." On the 5th day after the appearance of the ulcer several rigors were experienced and the temperature reached 104° in the evening, on the following day a rash appeared on the neck, chest, back and on the palms and soles; this was an erythema with maculae, some of which had a petechial centre.

The spleen was enlarged, headache was severe and insomnia was marked during the 7 days that the fever lasted. A peculiar smell compared to a combination of the odour of hot oil and dirty clothes was noted. The pulse rate was never above 100, the fever ended by crisis on the 8th day. The Weil-Felix reaction tested with serum taken on the 8th day was negative.

Six months later a similar attack with fever, primary sore, etc., was again experienced by the author. A patient observed by the author developed fever 4 days after working on ground heavily infested with ticks, 2 days later pain was felt in the left axilla (enlarged glands) and a small ulcer (tache noire) was discovered in the scapular region. The fever was more severe than in the author's case and the termination was by lysis to normal on the 13th day. *D. H.*

FEJGIN (B.). Sur le *Proteus X19* isolé du typhus exanthématique. [*Proteus X19* **isolated from Cases of Exanthematic Typhus.**]—*C. R. Soc. Biol.* 1936. Vol. 123. No. 27. pp. 257–259.

Forty-eight samples of blood were taken from typhus cases, the serum was drawn off and tested for the Weil-Felix reaction which was positive in all; the clot was then taken and cultured in broth and then on to Endo's medium; of the 48 samples only one yielded a culture of a typical *Proteus X19*. This bacillus was agglutinated by the sera of typhus cases and by specific *X19* rabbit serum at the same titre as the stock *OX19* and also gave the typical cultural reactions of a *Proteus* bacillus.

A similar strain of *Proteus X19* was isolated from infected lice.

D. H.

Varela (Gerardo) & Barrera (Abel). L'agglutination des *Proteus X19* et *K* par les sérums de typhus endémique américain. [**Proteus Agglutination in Mexican Typhus Fever.**]—*Bull. Office Internat. d'Hyg. Publique.* 1936. Nov. Vol. 28. No. 11. pp. 2142–2145.

The sera of 50 cases of Mexican typhus were tested against *Proteus OX19* and *OXK*. Only one of these sera agglutinated *OXK*, the remainder agglutinated *OX19*. *D. H.*

Lillie (R. D.) & Dyer (R. E.). **Brain Reaction in Guinea Pigs infected with Endemic Typhus, Epidemic (European) Typhus, and Rocky Mountain Spotted Fever, Eastern and Western Types.**—*Public Health Rep.* 1936. Sept. 18. Vol. 51. No. 38. pp. 1293–1307. With 3 charts. [22 refs.]

The main conclusions in this paper are as follows :—

(1) The character of the individual brain lesions is not noticeably different in endemic or epidemic typhus and in Eastern and Western Rocky Mountain spotted fever.

(2) In Rocky Mountain fever more lesions are found in the pons and medulla than are seen in typhus fever. To demonstrate the location of the lesions serial sections of the brain must be made and examined.

(3) The presence of a scrotal and testicular reaction in endemic typhus does not decrease the intensity of the brain reaction but rather the reverse.

(4) The greatest number of lesions in the brains of guineapigs are to be found on the 2nd, 3rd and 4th day of the 2nd week of typhus infection. *D. H.*

Danielopolu (D.), Lupu (N. G.) Craciun (E.) & Petresco (M.). Recherches anatomo-cliniques sur le typhus exantématique. 2-ème communication. L'appareil cardio-vasculaire dans le typhus exantématique. Clinique—Anatomo-pathologie—Thérapeutique. [**The Pathological Anatomy of Exanthematic Typhus.**]—*Bull. Acad. Méd. Roumanie.* Paris. 1936. Vol. 1. No. 3. pp. 420–445. With 7 figs. (2 coloured).

This paper is not suitable for summary and the text and plates should be consulted by those interested. *D. H.*

Giroud (Paul). Variations quantitatives des rickettsies du typhus exanthématique du cobaye aux lieux d'inoculation. Influence des hormones. [**Variations in Rickettsia Numbers according to Inoculum.**]—*C. R. Soc. Biol.* 1936. Vol. 123. No. 28. pp. 368–370.

The author found that if the intraperitoneal inoculum employed is testicular washings very numerous Rickettsia will be found and also Mooser cells, but if brain is employed as inoculum Rickettsia only appear in small numbers and soon disappear again. If testicular extracts are given to female guineapigs similar results are achieved.

D. H.

Okamoto (Ryozo) & Masayama (Suguru). Nachweis des Fleckfiebervirus (R. Exanthematofebri) in Schnittpraeparaten aus den verschiedenen Organen der Ratten.—*Jl. Oriental Med.* 1936. Sept. Vol. 25. No. 3. [In Japanese pp. 619–623. With 12 figs. on 2 plates. German summary pp. 59–60.]

Maitra (G. C.) & Gupta (P. N. Sen). **A Note on Cases of Typhus Fever in Burma and their Distribution.**—*Indian Med. Gaz.* 1936. Oct. Vol. 71. No. 10. pp. 572–574. [11 refs.]

Since 1934 all sera sent to the laboratory have been tested for the Weil-Felix reaction, also the following information has been asked for in each case :—

(1) Any history of insect bite; (2) presence of rash; and (3) presence of adenitis.

One hundred cases have been detected, these cases are not confined to any particular area but are spread all over Burma.

Results of Weil-Felix Reaction.

Year	*Proteus OX19*	*Proteus OXK*
1934	12	5
1935	19	25
1936	35	10
	66	40

D. H.

Fejgin (Bronislawa). Sur le pouvoir hémolytique des filtrats des cultures de HX_{19} et de la suspension des *Rickettsia prowazeki*. [**On the Haemolytic Properties of Filtrates of Cultures of** *Proteus X19* **and of Suspensions of** *R. prowazeki*.]—*C. R. Soc. Biol.* 1936. Vol. 123. No. 26. pp. 40–42.

Filtered cultures of *Proteus X19* were shown to possess considerable haemolytic power, the minimal haemolytic dose was estimated at 0·001. An emulsion of the gut of infected lice was filtered and proved also to be haemolytic, 0·01 to 0·005 was the minimal dose ; there was no haemolysin in the filtered emulsion of normal lice.

Anti-*X19* sera neutralized the haemolysin of the rickettsial emulsion and so also did the serum of typhus convalescents. *D. H.*

Castaneda (M. Ruiz). **Studies on the Mechanism of Immunity in Typhus Fever. Complement-Fixation in Typhus Fever.**—*Jl. Immunology.* 1936. Oct. Vol. 31. No. 4. pp. 285–291. [17 refs.]

The results of the author's experiments tabulated in this paper show clearly that typhus immune serum contains complement binding antibodies for *R. prowazeki* but not for *Proteus*. On the other hand the sera from rabbits immunized against *Proteus X19* fix complement in the presence of *R. prowazeki* as well as with *Proteus*. It is suggested that the complement fixation test might be usefully employed in the diagnosis of typhus. *D. H.*

CASTANEDA (M. Ruiz). **Studies on the Mechanism of Immunity in Typhus Fever. I.** ***Rickettsia prowazeki*** **in the Different Stages of the Typhus Lesion. II. Allergic and Toxic Reactions produced with** ***Rickettsia prowazeki.*** **—***Jl. Experim. Med.* 1936. Nov. 1. Vol. 64. No. 5. pp. 689–699. With 8 figs. on 3 plates; pp. 701–715.

The washings from the peritoneum of rats infected with typhus virus were injected intradermally into guineapigs and the resulting lesions were examined.

A local inflammatory lesion was produced and in 72 hours Rickettsia could be found in the smears from these local sores; at first the organisms were in the polynuclear cells and also in cells in the capillary walls (Mooser cells), later they were also seen in the large macrophages along with ingested polynuclear cells; later on this phagocytosis results in the disappearance of Rickettsia from the lesion. Swelling of the lining of the small blood vessels was also noted. *D. H.*

CASTANEDA (M. Ruiz). **Studies on the Mechanism of Immunity in Typhus Fever. III. Demonstration of Opsonins for** ***Rickettsia prowazeki*** **in Typhus-Immune Serum.**—*Jl. Immunology.* 1936. Sept. Vol. 31. No. 3. pp. 227–237. With 2 figs. on 1 plate.

A demonstration of phagocytosis of the Rickettsia of Mexican typhus.

The materials employed were (1) defibrinated blood of normal guineapigs; (2) typhus immune serum from patients and convalescents or anti-typhus horse serum, also anti-*X19* serum from rabbits; (3) suspension of Rickettsia from the peritoneal fluid of infected and irradiated rats.

Equal volumes of immune serum and Rickettsia emulsion are mixed and incubated for one hour at 37°C.; 0·1 cc. of the above is then added to 0·4 cc. of the defibrinated blood and incubated for one hour, smears are then made and stained and 100 cells counted. In controls with normal serum no phagocytosis was seen but with the serum of immune persons and animals the leucocytes were packed with Rickettsia.

Guineapigs were inoculated with infected tunica washings and bled daily for 12 days after inoculation, phagocytosis of Rickettsia was noted after 96 hours and was marked after 5 days. Opsonins were noted in the blood of typhus patients 2–6 years after the fever. A volunteer was inoculated with Rickettsial emulsion and opsonins appeared in his blood. It is interesting to note that opsonins could not be demonstrated in the sera of rabbits inoculated with *Proteus X* bacilli. *D. H.*

ZINSSER (Hans) & MACCHIAVELLO (Attilio). **Further Studies on Typhus Fever. On Homologous Active Immunization against the European Strain of Typhus Fever.**—*Jl. Experim. Med.* 1936. Nov. 1. Vol. 64. No. 5. pp. 673–687. With 4 charts. [10 refs.]

It is necessary to obtain large numbers of Rickettsia for the production of vaccines. Irradiation of infected rats produces large numbers in the case of the rat virus but is of little use in the case of the virus of epidemic or European typhus. Weigl's method of preparing vaccine from infected lice is not suitable for the mass production of

vaccine. The authors suggest that it may be possible to obtain sufficient material for vaccine production by means of tissue culture of the European epidemic virus. Tunica scrapings from infected guineapigs are employed and serum and Tyrode or ascitic fluid is inoculated and incubated, the vaccine is later formolized. The employment of sero-vaccination on the lines of yellow fever immunization is also suggested, the virus employed being virulent defibrinated blood of guineapigs mixed with immune serum, or tissue cultures of the virus with immune serum. *D. H.*

Zinsser (Hans) & Macchiavello (Attilio). **Enlarged Tissue Cultures of European Typhus Rickettsiae for Vaccine Production.**—*Proc. Soc. Experim. Biol. & Med.* 1936. Oct. Vol. 35. No. 1. pp. 84–87. With 1 fig.

In order to obtain larger numbers of Rickettsia of European typhus virus in tissue culture for purposes of vaccine production the authors are employing large Erlenmeyer flasks of 250 cc. capacity ; about 20 cc. of the culture fluid is placed in these flasks giving a ratio of fluid to air space of about 1 to 12, which is the optimum ratio. The fluid employed is, 1 part horse serum to 4 parts Tyrode solution and the greatest number of Rickettsia are found on the 8th or 9th day of incubation. The cultures are treated with 0·1 per cent. formaline to make the vaccine. *D. H.*

Sigon (M.) & Migone (L.). Sulla febbre esantematica del litorale mediterraneo. (Contributo sperimentale.) [**Experimental Study on Mediterranean Typhus.**]—*Boll. Istituto Sieroterap. Milanese.* 1936. Oct. Vol. 15. No. 10. pp. 633–640. With 6 charts & 12 figs. on 2 plates. [47 refs.] French summary.

The author injected two guineapigs with the blood of a patient suffering from *boutonneuse* fever. The peritoneal fluid and emulsions of the organs of these two were inoculated into 11 more guineapigs in succession. Five to six days after the inoculation those of the three first passages showed a moderate rise of temperature and 4 of eight died in 1–7 days. In the fourth passage (3 animals employed) one died, the fifth passage resulted in no clinical signs of the virus. The animals which succumbed were examined and in all there was marked visceral congestion with small haemorrhages (two showed ecchymoses of the abdominal skin). Microscopically, the vessel walls of most of the organs showed hyaline change, vacuolization, infiltration with small round cells and fibroblasts, and scattered haemorrhages. Perivascular infiltration in the brain was rare. *H. H. S.*

Blanc (Georges). La vaccination contre le typhus exanthématique au Maroc. [**Prophylactic Inoculation against Typhus in Morocco.**] —*Bruxelles-Méd.* 1936. Nov. 22. Vol. 17. No. 4. pp. 116–120.

This lecture is a résumé of the work of the author on prophylactic inoculation in typhus with a living virus.

The virus is that of a mild type of murine typhus in Casablanca and emulsions prepared from the organs of infected guineapigs are mixed with ox bile and after 15 minutes contact 1 cc. of the diluted mixture is inoculated. The bile does not destroy the virus but modifies

it so that no fever is caused in the inoculated but immunity both to the homologous virus and to the virus of epidemic typhus is produced.

D. H.

Giroud (Paul). Immunisation contre le typhus à l'aide de cultures desséchées et enrobées du virus typhique murin. [**Immunization against Typhus by means of Murine Virus.**]—*C. R. Soc. Biol.* 1936. Vol. 122. No. 24. pp. 1071–1072.

Cultures of Tunis rat typhus virus No. 1 were prepared by the method of Nigg and Landsteiner. These cultures were dried and enclosed in yolk of egg.

Ten guineapigs were injected intradermally 3 times at intervals of 10 days with dried culture only, and when tested later with virulent virus all were immune.

Ten guineapigs were given 2 doses at 10-day intervals of dried culture enveloped in yolk of egg ; when tested later all were immune with one exception.

Ten guineapigs were given one dose only of emulsion of culture in yolk of egg, only one was immunized.

From the above it was decided that at least 2 doses of the vaccine are necessary.

Four monkeys were given 2 doses of culture in yolk of egg at an interval of 8 days ; all were proved to be immune. *D. H.*

Tennent (J. H.). **Atebrin in Tropical Typhus.**—*East African Med. Jl.* 1936. Nov. Vol. 13. No. 8. p. 254.

A case of fever was treated with atebrin, 1 tablet 3 times a day, as malaria was suspected. The patient developed a typhus rash and the Weil-Felix reaction was positive ; the fever ran its usual course but the patient had no concomitant discomforts such as headache or photophobia.

Half a dozen cases of typhus have since been treated with atebrin and in all six the same gratifying absence of complication has been noted. It is suggested that atebrin should be given a trial in typhus fevers elsewhere, as possibly these cases were all mild cases.

D. H.

Public Health Reports. 1936. Dec. 18. Vol. 51. No. 51. p. 1773.—**Spotted Fever, Eastern Type, on Vessel arriving at Los Angeles Harbor.**

Two cases of typhus were landed at San Pedro from a ship which had come from South American ports ; these cases were diagnosed by the Port Health authorities as Rocky Mountain spotted fever. *D. H.*

Gold (Herman) & Goodman (William). **Rocky Mountain Spotted Fever : Report of Two Cases.**—*Trans. College of Physicians of Philadelphia.* 1936. 4th Ser. Vol. 4. No. 1. pp. 50–51.

An account of 2 cases of Rocky Mountain spotted fever contracted in Pennsylvania, both the patients recovered. The Weil-Felix reaction was positive in each case and ticks were found on both. *D. H.*

DENGUE AND SANDFLY FEVER.

GRIFFITTS (T. H. D.) & HANSON (Henry). **Significance of an Epidemic of Dengue.**—*Jl. Amer. Med. Assoc.* 1936. Oct. 3. Vol. 107. No. 14. pp. 1107–1109.

In 1934, dengue fever appeared in Miami and spread rapidly throughout Florida, in 2 months the disease was reported in 70 municipalities. The authors ask " If dengue why not yellow fever ? " There are no people immune to yellow fever in Florida and there are plenty of *Aëdes* mosquitoes.

In Tampa in 8 weeks in 1934 over 1 million containers were found and larvae were found in 2 per cent. of these ; in Miami 68 per cent. of the containers held larvae. As the authors say, *Aëdes aegypti* production is not under control and never has been. The absence of yellow fever up to the present is due to :—

(1) The vigilance of the Public Health authorities.

(2) The absence of yellow fever from South American ports.

It is emphasized that mosquitoes may be carried by aeroplane and by motor. *D. Harvey*

LORANDO (N.). L'épidémie de Drapetsona et de Kokinia est une fièvre dengue. [**The Drapetsona and Kokinia Outbreak.**]—*Rev. Méd. et Hyg. Trop.* 1936. Sept.–Oct. Vol. 28. No. 5. pp. 265–273.

Apparently there has been difference of opinion as regards this epidemic, whether it was sandfly fever or dengue. The author emphasizes the differences between these two fevers, both from the clinical and epidemiological aspects.

The first cases appeared towards the end of August when sandflies were still present but in diminishing numbers, and these insects could not be found in September and October ; during these months many cases of fever occurred and *Aëdes* mosquitoes were abundant. If the cases had been sandfly fever they should have ceased in September. As regards the clinical course of the disease, of 28 cases, carefully observed, in 25 the fever exceeded 3 days and temperature charts showed the typical V or saddle-back curve. The author has never seen a rash in sandfly fever, but in many of the cases in the present series there was a very definite rash. The author is convinced that there was a definite outbreak of dengue (see paper by ALIVISATOS below). *D. H.*

ALIVISATOS (G. P.), with the collaboration of A. PAGONIS & T. TRIANTAPHYLLOU. Sur l'épidémie de fièvre de trois jours de 1935 à Athènes et ses environs. [**The Outbreak of Three-day Fever at Athens in 1935.**]—*Bull. Office Internat. d'Hyg. Publique.* 1936. Nov. Vol. 28. No. 11. pp. 2146–2166. With 1 folding plan.

In a paper by LORANDO (above) it is contended that the outbreak of fever in Greece in 1935 was dengue. In the paper now summarized Alivisatos and others consider that all the cases were sandfly fever. The authors made a very careful epidemiological survey of the cases and the houses and they discovered that in the houses where cases were occurring both sandflies and *Aëdes* in equal numbers could be

found until the second week of November. They agree that this is unusual (sandflies as a rule are seldom found after the end of September), but the summer of 1935 was unusually warm and the warm period lasted up till November, when a sharp cold spell occurred and the sandflies disappeared ; on the other hand *Aëdes* could still be found in large numbers through November and December 1935, and January of 1936. The cases of fever, however, ceased in November within 8 days of the disappearance of the sandflies, although *Aëdes* persisted throughout the winter. The conclusions of the report are that the epidemic of fever in Athens and the suburbs from May to November 1935 was sandfly fever. Only 7 per cent. of the cases observed by the authors were of the severe or major variety, a "dengue like" erythematous rash was noted in these cases.

In one house, at one and the same time, mild cases with and without exanthem and severe cases with and without rash were met with. It was also found that there was no difference clinically between cases in people who had had dengue in 1928 and those who had not had dengue previously. In children under 7 years of age who had been born since the 1928 epidemic the disease was mild and typical of sandfly fever, a rash was only noted in 7 per cent. of these cases, the same rate as in adults. As the epidemic developed so the cases became more severe and the fever lasted longer.

The spread of the epidemic was that of sandfly fever, slow and gradual and not sudden and explosive all over the city and suburbs as in the dengue epidemic of 1928 ; the range of flight of the sandfly is much more limited than that of the mosquito.

Aëdes is distributed over the old town and the suburbs, whereas sandflies are much more numerous in the suburbs than in the centre of the city ; the distribution of the cases was in accordance with this observation. *D. H.*

Shortt (H. E.), Poole (L. T.) & Stephens (E. D.). **Note on Some Experiments with Sandfly Fever Blood and Serum.**—*Jl. Roy. Army Med. Corps.* 1936. Oct. Vol. 67. No. 4. pp. 246–250. With 2 charts.

Volunteers who had been infected with sandfly fever the previous year were retested.

Three bloods from cases of sandfly fever in Peshawar were received in Kasauli and each sample was divided into 2. Half was injected into one of the volunteers in whom sandfly fever had been experimentally induced the previous year (old volunteer), and half into a volunteer giving no previous history of sandfly fever (new volunteer).

Results.

	Typical attack	Modified attack	Failed
Old volunteers ...	0	2	1
New volunteers ...	2	0	1

The results appear to show evidence of a degree of immunity 1 year after an attack of fever.

Serum was obtained from a case in Peshawar ; both whole serum and dried serum proved to be infective.

Immunization on the same lines as in yellow fever is suggested.

D. H.

THEODOR (Oskar). **On the Relation of *Phlebotomus papatasii* to the Temperature and Humidity of the Environment.**—*Bull. Entom. Res.* 1936. Dec. Vol. 27. Pt. 4. pp. 653–671. With 16 figs. [10 refs.]

The author has carried out experiments, the purpose of which was to discover the climatic factors which affect the life of *Phlebotomus papatasii*. The experiments define the thermal limits, the effect of temperature and humidity on the length of life of larva, pupa and adult, and similar matters.

It is found that the upper temperature limit differs slightly according to the sex and the nutritional state of the adult, but that in all cases the flies are killed by one hour at 43°C. (109°F.) ; the upper limit for larvae is the same. At first sight the figure seems remarkably low compared with the daily maxima which occur in summer in certain places such as Baghdad, in which the insect is common at that season. Doubtless, however, the insect avoids the extreme of heat and dryness by taking refuge in cracks in walls or in soil. At temperatures which are favourable, and which might be expected to occur in places where the larvae are found, it was observed that the larvae died in a few hours at all humidities unless the air was saturated with water, and actual droplets of water were present. The pupa also can only continue to exist in contact with moist surfaces. This is most unexpected (though natural enough in a Nematoceran, members of that group being so closely associated with aquatic life). Here, again, we may assume that the existence of the early stages in nature in the middle of a hot, dry, Mediterranean summer is possible, because they live deep enough in the soil to be in actual contact with running water. The adults, it appears, are quite unlike the larvae and pupae in relation to humidity, for at each of the four temperatures tested they showed unexpected powers of enduring humidities that are rather low ; for instance, at 23°C. (73°F.) flies which had fed once survived 9 days (mean) in saturated air, and as much as 7·5 at a humidity of 60 per cent.

In the course of his experiments Theodor made some interesting observations on the physiology of hibernation in the larva : relatively large quantities of ether-soluble material is accumulated at or just before hibernation, as indeed it is in many other insects. He also gives some precise facts about the weight of blood taken at a single meal. These facts may be valuable for many purposes, particularly if it is necessary to make a quantitative study of the number of flagellates which a sandfly could take up.

It is perhaps interesting that much of the work was done in London, modern methods of rearing the insect, largely developed by Theodor, making it possible to breed insects for experiments in a place where the necessary physiological apparatus was available.

The experiments must have been laborious to carry out, and difficult in view of the minuteness of the insect, but they lead one to a new conception of its life in nature. *P. A. Buxton.*

TROPICAL OPHTHALMOLOGY.

A Review of Recent Articles. XXVII.*

Conjunctiva.—Dimitry[1] has endeavoured to refute the theory that dust is the chief factor in the aetiology of pterygium. He asserts that the disease is more common in the verdure-clad State of Louisiana than in States where dust is very prevalent. Warmth, however, often seems favourable to the growth. (Desiccating and dust-laden winds are probably the chief factor.)

Sanyal[2] has described a form of kerato-conjunctivitis which is likely to be confused with trachoma and other conjunctival inflammations. The disease is characterized by the presence of yellowish points of degeneration in the membrane; these are often surrounded by small granules. In the majority of cases the preauricular gland is enlarged, and young persons may sometimes experience a slight rise of temperature. Vascularization and ulceration of the cornea may occur in acute or subacute cases. The keratitis may assume a variety of forms, and vascularization may closely resemble trachomatous pannus. Pathological examination showed intracellular and extracellular groups of small cocci which are assumed to be the cause of the disease.

Trachoma.—Kiewe[3] has published the result of experiments which confirm von Szily's observations regarding the development of lymph follicles in the vitreous and ocular tissues of rabbits which have been subjected to the intraocular injection of trachomatous material. The injection is made into the anterior chamber after a paracentesis has been performed. As regards the specific nature of the reaction one positive result occurred after inoculation with material from a case of spring catarrh.

Busacca[4] remarks that the knowledge of European ophthalmologists regarding trachoma in Brazil is a little vague. He believes that the disease was present in the country long before the first influx of Italians and other immigrants in the second half of the last century—possibly it was introduced by the Conquistadores. About 14 per cent. of nearly 3,000 eye patients were found to be trachomatous, the working classes being chiefly affected. On the whole, the disease is benign, and serious complications are uncommon. Sédan[5], after reviewing the reasons given by various authors as to why one eye should remain

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* For the twenty-sixth of this series see Vol. 33, pp. 902–905.

[1] Dimitry (Theodore J.). The Dust Factor in the Production of Pterygium.—*Amer. Jl. Ophthalm.* 1937. Jan. Vol. 20. No. 1. pp. 40–45. With 2 maps.

[2] Sanyal (Saradindu). Keratoconjunctivitis with Adenitis in Calcutta.—*Amer. Jl. Ophthalm.* 1936. Nov. Vol. 19. No. 11. pp. 982–989. With 5 figs.

[3] Kiewe (Paul). Results of Intra-Ocular Inoculation of Trachoma. (On the Question of the "Follicle-Building Agent" of von Szily.)—*Brit. Jl. Ophthalm.* 1936. Oct. Vol. 20. No. 10. pp. 576–585. With 6 figs.

[4] Busacca (Archimede). Impressions et données statistiques sur le trachome dans l'état de S. Paulo.—*Rev. Internat. du Trachome.* 1936. Oct. Vol. 13. No. 4. pp. 161–171. With 1 graph.

[5] Sédan (Jean). Les facteurs lacrymaux et traumatiques dans le trachome unilatéral.—*Rev. Internat. du Trachome.* 1936. Oct. Vol. 13. No. 4. pp. 184–193. [16 refs.]

healthy in unilateral trachoma, states that he has observed an abnormality of the lachrymal passages in the affected eyes of many such patients. He has recorded three cases in which the disease followed a mild traumatic kerato-conjunctivitis, whilst the uninjured eye remained healthy. [It must be kept in mind that diagnosis is particularly difficult when only one eye is attacked by trachoma.] MIHAIL[6] has investigated the differential leucocyte count in 41 trachoma patients and has found a tendency to a slight increase in the number of mononuclears; the increase in the lymphocytes was even less noticeable.

BENGTSON (Ida A.) and ROLUFS[7] consider that the inclusion body plays a part in the aetiology of the disease and probably originates from a rod-shaped micro-organism. This rod-shaped organism passes through a resistant phase—an "elementary-body" stage, and the blue-staining matrix of the inclusion body represents the remains of the rod forms. "The initial bodies" of Lindner probably represent the rod form of the organism after it has been acted upon by the lytic substances of the conjunctiva or of the epithelial cells. THYGESON[8] in a review of the aetiology of trachoma concludes (1) that it is a specific communicable disease; (2) it is not caused by a specific bacterium or by repeated secondary infections; (3) the agent belongs to the group of filterable viruses and is likely to be identical with the elementary body of Prowazek and Halberstaedter. LENZEN & GRADLE[9] report their experiences of over 1,100 cases of trachoma. The majority were treated by scrubbing with chaulmoogra oil, and by the use at home or in hospital of 1–5,000 oxycyanide of mercury lotion.

Cornea.—MAURY[10] has reported the pathological examination of an eye which was subject to nodular dystrophy of the cornea. The appearances found suggest that the primary lesion is a hyalin-lipoid degeneration of localized portions of the corneal lamellae. WRIGHT[11] has described a degenerative condition of the cornea which he observed fairly often in Southern India. Irregular yellowish nodules project from the corneal surface; these are covered by epithelium and invade the *substantia propria*; they appear to contain an amber-coloured, oily fluid. Yellow, necrotic matter may occupy the intervals between the globules. The tissue exhibits a bluish haze, but gives an impression of transparency; slit-lamp examination of this area shows tiny refractile points lying deep to Bowman's membrane; these possibly represent the initial stages of the degeneration. The tissue in the more degenerated

[6] MIHAIL (Al. C.). Recherches sur la formule leucocytaire chez les trachomateux. —*Rev. Internat. du Trachome.* 1936. Oct. Vol. 13. No. 4. pp. 193–199. [13 refs.]

[7] BENGTSON (Ida A.) & ROLUFS (L. S.). Observations on the Epithelial-Cell Inclusions of Early Uncomplicated Trachoma.—*Amer. Jl. Ophthalm.* 1936. Mar. Vol. 19. No. 3. pp. 229–238. With 10 figs. [12 refs.]

[8] THYGESON (Phillips). An Analysis of Recent Studies on the Etiology of Trachoma.—*Amer. Jl. Ophthalm.* 1936. Aug. Vol. 19. No. 8. pp. 649–653. [37 refs.]

[9] LENZEN (A. F.) & GRADLE (H. S.). The Treatment of Trachoma.—*Amer. Jl. Ophthalm.* 1936. Aug. Vol. 19. No. 8. pp. 665–668.

[10] MAURY (Franklin H.). Pathology of Lattice and Nodular Dystrophy of the Cornea.—*Amer. Jl. Ophthalm.* 1936. Oct. Vol. 19. No. 10. pp. 866–872. With 4 figs. [13 refs.]

[11] WRIGHT (R. E.). Interstitial Degeneration of the Cornea.—*Amer. Jl. Ophthalm.* 1936. May. Vol. 19. No. 5. pp. 413–417. With 2 figs.

areas is very friable. The cornea is anaesthetic. The disease primarily affects males over the age of 30.

Cataract.—SPAETH[12] has reported the rapid development of bilateral cataract in a woman aged 37 who had dosed herself with dinitrophenol in order to reduce her weight. General symptoms included mental apathy and instability, with a fall in blood calcium and clinical signs of tetany. The cataracts were extracted and parathyroid medication remedied her general symptoms.

Two somewhat similar cases are reported by VEASEY.[13] Rapid lens degeneration appears to be characteristic of the poisoning, but the changes may be delayed.

WHALMAN[14] has tabulated 27 cases of the same condition. He remarks that the anterior layer of the lens capsule becomes spotty, dry and lustreless, and fine, gray, cloudy opacities appear beneath it. Irregular opacities appear in the deeper layers of the cortex. Dark spaces, resembling fluid clefts, appear in the lines of lens suture. Swelling is a marked feature, and acute glaucoma supervened in two patients of the series. He ascribes the lens changes to a hydrolysis following damage to the capsular cells.

Leprosy.—KING[15] describes the ocular complications he has met with in the leprotic patients under his care at Chelmsford, where some 14 patients are inmates. One of the most characteristic changes in the eye is the development of a round circumscribed infiltration in the tissue at the *limbus* ; this is somewhat gelatinous in appearance and is usually situated in the upper temporal quadrant. It tends to spread round the cornea and produces a loss of definition of the *limbus*. The corneal opacity becomes superficially vascularized, leading to leprotic pannus. Another distinctive form of keratitis is the appearance of greyish spots in the *substantia propria* ; the whole thickness of the *substantia* is involved in the neighbourhood of the *limbus*, but the inflammation tends to become more superficial as it approaches the centre of the cornea. In other cases a deep infiltration may be found spreading from the periphery ; this occurs as a sequel to leprotic cyclitis. Corneal anaesthesia is almost the rule in all patients. Leprotic nodules in the iris are uncommon, but an insidious iridocyclitis often occurs. A number of greyish, discrete spots are seen in the iris, and atrophy and depigmentation of the stroma may be found. Subconjunctival medication is disappointing, and the most hopeful surgical procedure is excision of the episcleral nodule at an early stage. Exposure keratitis is treated by tarsorrhaphy. The author remarks that the eyes in leprosy tolerate surgical interference extremely well.

Onchocerciasis is attracting increasing attention as a cause of blindness in tropical countries. STRONG[16] has described his obser-

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[12] SPAETH (Edmund B.). Dinitrophenol Cataracts with Signs of Tetany.—*Amer. Jl. Ophthalm.* 1936. Apr. Vol. 19. No. 4. pp. 320–323. With 1 fig.

[13] VEASEY (Clarence A.). Report of Two Cases of Cataract following the Use of Dinitrophenol.—*Amer. Jl. Ophthalm.* 1936. Apr. Vol. 19. No. 4. pp. 332–334.

[14] WHALMAN (Harold F.). Dinitrophenol Cataract.—*Amer. Jl. Ophthalm.* 1936. Oct. Vol. 19. No. 10. pp. 885–888.

[15] KING (E. F.). The Eye in Leprosy.—*Brit. Jl. Ophthalm.* 1936. Oct. Vol. 20. No. 10. pp. 561–569. With 5 figs. [31 refs.]

[16] STRONG (R. P.). Onchocerciasis in Central America and Africa.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. Mar. Vol. 30. No. 5. pp. 487–499.

vations on the disease as it occurs in Central Africa. Extensive infection is found amongst the pigmies and amongst the Basonge tribe. Those cases in which the nodules are located on the head or shoulders seem specially likely to suffer from ocular complications. Microfilariae are found in the greatest number in the skin in the vicinity of the tumours, and are more numerous in the ocular conjunctiva when the nodules are situated in the upper portion of the body. *S. damnosum* is principally concerned in the transmission of the disease, but *S. neavei* is also concerned. The keratitis which is associated with the disease is due to invasions of the *substantia* by the microfilariae.

The tenth annual report of the Giza Memorial Ophthalmic Laboratory[17] for the year 1935 contains the usual interesting account of the pathological activities of the Institution and records of several rare forms of eye disease. The most important item is the contribution by R. P. Wilson on the various forms of conjunctivitis found amongst children in Egypt and the Near East. A striking feature is the almost complete absence of *ophthalmia neonatorum* in the country. The principal causes of infectious ophthalmia in Egypt are the gonococcus, Koch-Weekes bacillus and Morax-Axenfeld diplobacillus. Morax-Axenfeld infections, though common, are unimportant, but it is estimated that from 65 to 70 per cent. of blindness met with is due to the gonococcus. The infection has not a venereal origin, but is carried from eye to eye. Flies thrive best at a temperature of 31°C, and die off at 35°C. There are two main-fly-breeding seasons in Egypt: (1) March to May, and (2) in October, at which times climatic conditions favour the insects. The incidence of Koch-Weekes ophthalmias rises sharply in April when the temperature is 27° to 28°C. A fall occurs in May and June as the weather grows hotter, but a secondary rise occurs in the autumn during the second fly-breeding season. Very little gonococcal ophthalmia is seen during the winter months, and the epidemic begins during June, reaching its maximum in October with a slight check during August. The organism does not withstand drying well and its growth is favoured by high relative humidity. There is no doubt that the acute ophthalmias are intimately connected with trachoma, and the onset of this disease is often first noticed after an attack of acute ophthalmia. Where there is much ophthalmia there will be much trachoma, provided that trachoma is endemic. Acute infections render the conjunctiva more vulnerable and also provide a greater quantity of infective discharge. "There is absolutely no doubt, however, that neither a chronic Koch-Weekes conjunctivitis nor a gonococcal conjunctivitis can give rise *per se* to trachoma whether in the presence of adenoidism or any other diathesis."

The *Bulletin of the Ophthalmological Society of Egypt*[18] for the year 1936 is mostly occupied by a symposium on trachoma under the presidency of Dr. Mohammed Abbas El Bakly. In discussing the histopathology of the disease Wilson remarks that in its early stage the trachoma follicle is practically indistinguishable from the follicle

[17] Egypt: Ministry of Public Health. Tenth Annual Report of the Giza Memorial Ophthalmic Laboratory, Cairo, 1935 [Wilson (Rowland P.), Director].—136 pp. With 7 plates (5 coloured), 42 figs. & 4 graphs. 1936. Cairo. [25 P.T.]

[18] Bulletin of the Ophthalmological Society of Egypt. 1936. Vol. 29. Session 33. pp. xxviii + 220. With numerous illustrations.

of follicular conjunctivitis. He regards the corneal changes as being due to direct contact infection from the lid and not to an extension by way of the bulbar conjunctiva; he expresses disagreement with MacCallan's statement that the so called "bleb-like excresences" are due to a blockage of the ducts of the Meibomian glands. Meyerhof reviews the history of treatment in ancient times, and it is interesting to note the reliance placed upon rubbing and the use of preparations of copper; Divine aid, too, was frequently invoked. Farid Masoud, Attiah and El Tovgy refer to the value of attending to the general constitutional condition of the patient.

H. Kirkpatrick.

MISCELLANEOUS.

i. Giemsa (G.) & Nauck (E. G.). Rasse und Gesundheitserhaltung sowie Siedlungsfragen in den warmen Ländern. [**Race, Health Preservation and Colonization in Warm Countries.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1937. Jan. Vol. 41. No. 1. pp. 9–21.

ii. Werner (Heinrich). Ueber Rasse und Gesunderhaltung sowie Siedlungsfragen in warmen Ländern.—*Ibid.* pp. 22–29. [17 refs.]

iii. Olpp (G.). Rasse und Tropenkrankheiten. [**Race and Tropical Disease.**]—*Ibid.* pp. 35–41.

iv. Fischer (Otto). Ueber den Gesundheitszustand aus den warmen Ländern kommender Europäerkinder (Beobachtungen aus dem Tübinger Tropen-Genesungsheim). [**Health of European Children coming from Hot Countries : from the Tübingen Convalescent Home.**]—*Ibid.* pp. 41–50. With 7 figs.

v. Seiffert (Gustav). Bedeutung und Organisation ländlichen Gesundheitsdienstes unter tropischen und subtropischen Verhältnissen. [**Importance and Organization of Rural Health Services in the Tropics and Subtropics.**]—*Ibid.* pp. 50–72.

i. This paper concerns chiefly the results of German colonization of Espirito Santo, Brazil, on the margin of the tropic zone.

This German settlement began in 1840, was reinforced in 1857 and again in 1873 ; additions practically ceased after 1880, when there were about 3,000 persons. In 1912 the German population was estimated to be 17,000–18,000 (Wagemann) and by 1935 it had reached 25,000 in a total population of 587,000. There has been no mixture with the indigenes.

The authors visited the colony and here report their observations. From an examination of the church records and other sources they calculate the figure of 30,000 for the present German population. Figures of births and deaths are given and of infant mortality, with comparative rates for France and Germany ; birth and death rates in 1912 were 48·5 and 7·8 and in 1926–35, 46·1 and 8·7. It is clear, write the authors, that the conditions for acclimatization in Espirito Santo are fully met.

They consider the incidence of disease. Epidemics of yellow fever occur on the coast but affect the highlands little. Malaria is surprisingly scarce. Examination of 316 school children from four districts did not reveal a single infected child (spleen or parasites). There are few mosquitoes in the houses and nets are not used. Amoebic dysentery is rarer than in other tropical regions, a rarity attributed to the fact that raw vegetables are little used and human excreta are not employed as manure ; it is stated that in S. Paulo where the Japanese raise salads, the infection has spread. The lack of protection of water supplies, however, is a danger. Helminth infestations, especially hookworm, are common.

In 1860, Tschudi, who travelled in Espirito Santo, reported on a disease called " Opilação," which he attributed to a faulty diet and especially the use of manioc. This was hookworm disease ; the presence of hookworms in the bowel is almost universal in the absence of latrines and with the habit of going barefoot. The percentage in lowland children was 90·9 and in the highlands 88·7. High eosinophilia is general, but the haemoglobin values are rarely below 70 per cent. and usually 70–80. Symptoms are rare. The worm is Necator. Badly affected children are, however, met with, chiefly in the lowlands

and among people who possess neither land nor cattle and live on maize and black beans; *i.e.*, the presence or absence of symptoms depends on the economic position of the family.

The authors found 4 children with *Schistosoma mansoni* infection, hitherto only suspected in Espirito Santo; the snail hosts were not discovered. Visceral leishmaniasis probably occurs. Leprosy occurs in Espirito Santo but not among the colonists. Tuberculosis is comparatively rare and venereal diseases are absent—this the result of the slightness of contact with the natives. Ulcers on the lower legs and elsewhere are common, usually non-specific but in some instances ulcus tropicum.

The action of the climate on the bodily constitution of the colonists is next considered. They do all the hard work, such as in the tropics is usually relegated to the natives—clearing, road-making, house building, etc., and the whole family, men, women and children, take part. Sunstroke and heatstroke are rare. Broad-brimmed hats and kerchiefs are worn during field work. The methods of cultivation lead to exhaustion of the soil and the colonists have overflowed on to the lowlands, where, moreover, the soil is more productive; there is no evidence, however, that they are any the worse. These are for the most part young people of the 2nd and 3rd generation.

As to body frame and growth the colonists show no essential difference from the agriculturists in North Germany; the lean type predominates. The authors think that the success of the German colonization of this district is due to the good, resistant constitutions of its founders and that the failure of similar attempts elsewhere is attributable to the unsuitability of the material.

They found no degeneration among the families, though such has been reported, and while marriage between near relatives is unusual they note that it must occur to some extent in the future.

Their study has shown them that German agriculturists can settle in tropical regions and they throw out the suggestion that "as soon as Germany is again in possession of her colonies" these Brazilian colonists might be transferred to them.

[Those interested in this tropical settlement who have access to a file of this *Bulletin* should consult 1920, Vol. 15, pp. 296–8 and 1935, Vol. 32, p. 65, especially the former.]

ii. After an interesting discussion of the literature with references to the views of SAPPER, CILENTO and others, Werner sums up to this effect:—

In the so-called marginal tropics (Randtropen) such as Espirito Santo and N. Queensland acclimatization of the white race has succeeded. Conditions of success are (*a*) the disappearance or recession of the most important tropical infections, malaria, yellow fever, ankylostomiasis; (*b*) that the coloured population be segregated or rendered hygienically harmless; (*c*) that bodily work be performed by the white colonists; (*d*) that the founders of the colony be healthy.

Acclimatization in stages (descent from the high ground to the plains) has proved useful.

For the true tropics (Innentropen) there is not yet sufficient information for a decision. No purely climatic factors are known such as would exclude possibility of acclimatization of the white races therein. For the present the hygienic factors are so unfavourable that its discussion seems premature, but it is not for all time without hope.

[It is interesting to note that according to Werner the Japanese have acquired from the Government of Brazil a million hectares of land in the primaeval forest of Amazonas for settlement of their excess population, a region hitherto regarded as the most unhealthy in the world.]

iii. The author considers the subject on the lines of an article which he has contributed to a forthcoming book of the same title. **Half his space is given to malaria.**

It seems that the greater part of the differences between racial incidence of any infective tropical disease is attributable to difference in opportunity for infection rather than to difference in susceptibility and that it is hard to isolate these two factors.

iv. The author has analysed the records of 1,044 children, born and bred in the tropics or subtropics, and admitted to the Tübingen home.

He prefaces his remarks by saying that not all those admitted are ill, some are quite healthy and accompany their parents. He reckons as tropics, Central Africa, S. China, India, New Guinea, Central America and the north of S. America; as subtropics, N. China, S. Africa, the Near East, and the rest of S. America (but only tells us that 707 came from the tropics and 337 from the subtropics).

Of malaria and dysentery the percentages diagnosed were for the tropics 4·5 and 6·5, and for the subtropics 1·5 and 9·5.

Severe malaria was rare. No information is given of the kind of dysentery. Two tables are given of the worm infestations, which affected 48·5 per cent. of the tropics children and 39 per cent. of the subtropical; one table gives the percentages of each intestinal worm in the two categories, the other the percentage of hookworm according to age. Of children from the German colonies in S. Brazil (numbers unstated) 64 per cent. harboured worms. Hookworm was most frequent in South Seas children. Trichuris headed the list in the tropical subjects. Liver and lung flukes and bladder bilharzia were not met with.

Of non-tropical infections, measles and whooping cough head the list (whether contracted in the tropics or at Tübingen is not clear). Tuberculosis was rarely diagnosed; when present it affected the hilus glands and the subjects appeared well. The author notes the importance of inflammation of lymphatic tissues in the nose and throat region, met with frequently. Typical cases of rickets were seen from China and India.

Curves of the height and weight of children from hot countries and from Germany show that growth of both boys and girls from hot countries tops by a little that of German children and that though the weight curves are less definite, intersecting more than once, the weight of tropical children at all ages is not appreciably less than that of their fellows in the homeland. A table of the haemoglobin values (technique not given) shows 71·8 per cent. of tropical children as having over 80 per cent., 28·2 per cent. as having less than 80, and of these 3·2 per cent. as having less than 65 per cent. haemoglobin.

The conclusion reached is that the health of these children was satisfactory, that they had suffered to a considerable extent from tropical diseases, but that with the present knowledge of these diseases it is possible to rear white children in hot countries and to make of them strong and healthy adults.

v. The author treats the subject of rural health services in the tropics in full and comprehensive detail. Perusal of his paper will

repay readers of German. The problems with which he deals have, however, been discussed repeatedly in the reports of the D.M.S's. of many British colonies and in papers in the journals.

A. G. Bagshawe.

Derrick (E. H.). **Laboratory of Microbiology and Pathology. Special Investigations.**—Reprinted from *Queensland Ann. Rep. of Director-General of Health & Med. Services 1935–36.* 6 pp. With 4 charts.

A hitherto undescribed type of fever occurring in Brisbane.

The fever lasts 7 to 24 days, with acute onset. Three types of fever are met with: (1) short type 7 to 11 days typhus-like, (2) typhoid type lasting 17 to 24 days, ending by lysis, (3) relapsing type suggestive of undulant fever.

Headache is a constant symptom and may be severe and persistent, with pain in the back and limbs.

Guineapigs can be infected by injection of blood from the cases or blood or liver from infected guineapigs. After an incubation period of 4 to 18 days they develop fever, lasting from 1 to 6 days. One attack of the fever in a guineapig renders it immune to reinfection. Blood culture in patients was negative and the Widal and Weil-Felix reaction were also negative. No spirochaetes or symptoms of Weil's disease were detected in any of the experimental animals, so far it has not been possible to correlate this disease with any known fever.

D. Harvey.

Moore (Morris). La blastomicosis y la cromomicosis de la América del Norte y del Sur. [**Blastomycosis and Chromomycosis in North and South America.**]—*Bol. Inst. Clín. Quirúrg.* 1936. Vol. 12. Nos. 103-104. pp. 230–239. With 13 figs.

A general account which cannot well be abstracted, illustrated by pictures of the clinical condition (but no text description of cases), the tissue reactions and the growing fungus *Phialophora macrospora* and others. Of the former the author describes *Coccidioides immitis* and *C. brasiliensis*, *Paracoccidioides cerebriformis* and of the latter *Phialophora verrucosa* and *Acrotheca pedrosoi* see this *Bulletin*, 1931, Vol. 28, p. 404; 1933, Vol. 30, p. 590). He divides cases after a somewhat arbitrary clinical plan; Coccidioidal into eight forms: (1) Primarily of skin with generalization; (2) Primarily pulmonary, with generalization, but not affecting the skin; (3) Primarily pulmonary with secondary subcutaneous lesion; (4) Primarily pelvic, no skin lesions; (5) Primarily meninges without skin lesions; (6) Primarily in bone, secondary in skin; (7) Primarily in joints; (8) Primarily subcutaneous. Blastomycosis is classified on a pathological basis: (1) Papulo-ulcerative; (2) Verrucose and papillomatous; (3) Gummatous. *H. H. S.*

Jurukoff (B.). Massenhafte Erkrankungen beim Menschen hervorgerufen durch *Pediculoides ventricosus.* **Human Infestation by *Pediculoides ventricosus*.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1937. Mar. Vol. 41. No. 3. pp. 337–341. With 2 figs. [10 refs.]

In the district of Bourgas, close to the Black Sea in South-east Bulgaria, men are commonly infested by the mite *Pediculoides ventricosus*, which causes a very troublesome dermatitis.

The author gives a brief description of the mite (though he does not make it clear that it has been identified by a competent authority). It is found in great abundance among the refuse of cereals and on sacks, etc., and frequently on the bodies of men engaged in dealing with the sacks. Cases of dermatitis due to the mite are very common among these men, but the condition does not spread to the rest of the population. Irritation frequently lasts one to two weeks and reinfestation is common. *P. A. Buxton.*

Frimberger (Ferdinand). Mikropipette zur Anstellung der Blutkörperchen-Sedimentierungs-Reaktion aus Fingerbeerenblut oder aus Venenblut. [**Micropipette for the Determination of Sedimentation-Rate with Blood from Finger-Prick or from Vein.**]—*Muench. Med. Woch.* 1937. Jan. 1. Vol. 84. No. 1. pp. 25–26. With 4 figs.

A micro-technique is described which can be used with blood obtained either from a vein or from a finger-prick. A special pipette, two models shown in diagram, consists of a lower portion in which about 0·125 cc. of blood can be measured and accurately mixed with 5 per cent. citrate solution, and an upper portion (separated from the lower portion by a stopcock in the more expensive model) into which the mixture is drawn and in which the sedimentation is observed. Readings are taken every half-hour, and the maximum difference of two such readings is the figure recorded. The maximum difference can be obtained within 1 hour in the case of rapidly-sedimenting blood, and within 2½ hours in other instances. These figures are only comparable among themselves and not directly with figures obtained by any other method, and it is to be noted that tests carried out in parallel with the Westergren method have indicated that differences in cell-volume of the blood may affect the two methods differently. It is claimed that the author's technique gives results as good as, if not better than, those of the Westergren method. A further publication on the subject is stated to be forthcoming. *P. H. Martin.*

Napier (L. Everard) & Das Gupta (C. R.). **Haematological Studies in Indians. Part VI. Investigations in 100 Cases of Marked Anaemia amongst Tea-Garden Coolies.**—*Indian Jl. Med. Res.* 1937. Jan. Vol. 24. No. 3. pp. 855–909. With 17 charts.

This paper deals with an extensive haematological investigation in two series of definite cases of anaemia amongst tea-garden coolies who originally came from Upper Assam or different parts of India. The selection was made mainly on clinical grounds such as skin pallor, puffiness of the face, oedema of the legs and dyspnoea, and a Tallqvist reading of 50 per cent. or less was taken as a criterion for investigation. Haemic murmurs were common, the pulse rate varied from 90 to 100, while the systolic blood pressure was seldom above 110 mm. Hg. Koilonychia was not noted. Night blindness was a common complaint, but there were few other obvious signs of specific nutritional deficiency. Eighty out of 87 cases showed free hydrochloric acid without the administration of histamine. In no instance was pernicious anaemia encountered and with very few exceptions the anaemia was of the microcytic-hypochromic type. In 39 out of 41 cases the satisfactory response to treatment with large doses of iron indicated that the

anaemia originated in an iron deficiency. The conclusion reached was that hookworm infection was almost certainly the main factor in the production of this anaemia. As, however, a normal haemoglobin level may co-exist with a heavy hookworm infection, the authors consider there is probably some other factor that determines the incidence of anaemia in certain cases and not in others. The splenic index amongst these coolies varied from 28 to 39 per cent. Malaria, however, was not considered to be an important factor, as it produces a different type of anaemia with destruction of red cells, but without the loss of iron from the body which occurs in hookworm anaemia. The diets were ill-balanced and deficient in good protein and in fat, but there was little evidence of any vitamin deficiency, except possibly of A. Dietetic treatment alone produced no effect on the blood picture.

N. Hamilton Fairley.

Wills (Lucy), Clutterbuck (P. W.) & Evans (Barbara D. F.). **A New Factor in the Production and Cure of Certain Macrocytic Anaemias.**—*Lancet.* 1937. Feb. 6. pp. 311–314. With 6 figs. [13 refs.]

Tropical macrocytic anaemia is generally regarded as a deficiency state, due to lack of extrinsic factor in the diet. If this be so, then the final deficiency in the body must be in liver principle just as it is in pernicious anaemia. But in the latter disease spinal cord involvement is common and there is hyperbilirubinaemia and an increased output of urobilin in the urine, whereas in uncomplicated tropical macrocytic anaemia this is not the case. In rhesus monkeys suffering from nutritional anaemia there is no hyperbilirubinaemia.

With the object of investigating the problem of this nutritional macrocytic anaemia and of the haemopoietic factor or factors present in yeast and liver, certain monkey experiments were undertaken. The therapeutic activity of different extracts was judged by the height of the reticulocyte response and the rise in the red cell count and haemoglobin percentage following their administration. In rhesus monkeys, in which tropical macrocytic anaemia was experimentally induced, injections of campolon proved effective, though surprisingly large doses were often necessary to induce a maximal response. Injections of anahaemin on the other hand, which had been found by Ungley to be active in two cases of pernicious anaemia, were absolutely inactive even in a large dosage in monkeys which later responded to campolon. The activity of the relatively crude extract campolon, and the inactivity of the purified factor anahaemin, suggest that the causation of nutritional anaemia of monkeys cannot be lack of Castle's extrinsic factor in the diet and liver principle in the body. It would appear that some other factor is involved.

The relationship of the yeast factor to vitamin B_2 complex was also investigated and it was shown in rhesus monkeys that flavin was not the haemopoietic factor. The separation of the liver and yeast haemopoietic components from the vitamin B_6 component of the vitamin B_2 complex was next attempted by applying the method of Dakin and West for separation of anahaemin from crude liver extracts. Fractionation by the use of Reinecke salt which precipitated anahaemin led to disappointing results, but good results were obtained by using saturation with ammonium sulphate. Both yeast filtrates and campolon were by this means separated into fractions insoluble and

soluble in saturated ammonium sulphate. The two fractions from campolon were tested on both men and monkeys, and those from yeast on monkeys only. The insoluble fraction from campolon, which would contain any anahaemin present, induced an immediate remission in two untreated controlled cases of pernicious anaemia, though it was completely inactive in monkeys. The same monkeys subsequently responded to similar parenteral injections of the soluble fraction. Similarly, with yeast extract given *per os*, the insoluble fraction was completely inactive in anaemic monkeys which, however, responded to treatment with the soluble fraction.

The authors conclude that there is some evidence that both factors may be necessary for haemopoiesis in man and rhesus monkeys, but that in the production and cure of the nutritional anaemia of the monkeys it is the soluble fraction that is mainly implicated. Its action in tropical macrocytic anaemia of man is under investigation. The two factors must be present in those extracts of liver, yeast and wheat germ that are active either alone or after mixture with gastric juice in both the monkey nutritional anaemia and pernicious anaemia.

N. Hamilton Fairley.

KAMPMEIER (R. H.) & CAMERON (Paul B.). **Pernicious Anemia in the Negro.**—*Amer. Jl. Med. Sci.* 1936. Dec. Vol. 192. No. 6. pp. 751–756.

Although anaemia in various forms is found in the negro, true pernicious anaemia is regarded as a rarity.

The present series comprises 18 negroes with anaemia of megalocytic type. In 14 instances the authors consider the diagnosis of true Addisonian pernicious anaemia may be definitely accepted since there was macrocytic anaemia with a high colour index, achlorhydria and an appropriate response to liver extract therapy. Clinically the patients presented the same signs and symptoms as those seen in whites, but in a somewhat accentuated form owing to the disease being further advanced when the patients sought medical assistance. Cord changes manifested by numbness, ataxia, difficulty in walking, abnormal reflexes and loss of vibratory sense were strikingly common. Although only four of their series were known to be of mixed white and negro blood, it was quite possible the rest were also. For this reason the authors still accept the generally held opinion that pernicious anaemia probably does not occur in the pure blooded negro.

N. Hamilton Fairley.

CRANDALL (Noble F.). **Hemophilia in the Negro.**—*Amer. Jl. Med. Sci.* 1936. Dec. Vol. 192. No. 6. pp. 745–751. With 2 figs. on 1 plate.

In a careful review of the literature the author found not a single instance of undoubted haemophilia in the negro. The present paper records a typical example except that there was no definite genealogy of this disease. Two brothers, a maternal uncle and grandfather, had, however, been subjects of frequent nose-bleeding. The patient was a very black negro with a history of immoderate haemorrhage from several sources during early childhood. He had developed haemarthrosis of the left knee joint and joint changes similar to those found in haemophilia. In only 1 out of 13 examinations was the

coagulation time of the blood normal, this exceptional finding being recorded during an active period of haemorrhage. The coagulation time was still markedly prolonged five months after cessation of haemorrhage. The platelet count, the tourniquet test, the clot retraction and the Wassermann and Kahn tests were all negative.

N. Hamilton Fairley.

Feng (L. C.). **The Hibernation Mechanism of Mosquitoes.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1937. Mar. Vol. 41. No. 3. pp. 331–337. With 2 figs. [14 refs.]

The author reports his observations on the hibernation of mosquitoes in the neighbourhood of Peiping China.

Aëdes koreicus breeds in summer in earthenware pots used for domestic purposes. In winter the custom is to dry these pots and leave them in the open inverted, and it is found that live eggs continue to exist on the inside of the pot, even though exposed to temperatures as low as −15°C.; the author recovered living eggs from 31 out of 42 pots examined. The rot holes in trees are generally dry throughout the winter, and indeed until the rains of the following July, but two species of *Aëdes* survive this long period as eggs. *Anopheles pattoni* goes through the winter as a larva which will withstand freezing in a block of ice for several months: *A. lindesayi* also passes the winter as a larva. *Culex pipiens* var. *pallens* hibernates as a fertilized female. *P. A. Buxton.*

Jobling (B.). **The Development of Mosquitoes in Complete Darkness.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. Jan. 26. Vol. 30. No. 4. pp. 467–474. With 2 figs.

The experiments show that the larvae of *Culex pipiens*, *C. fatigans* and *Aëdes argenteus* develop successfully in complete darkness. Mosquitoes can also pair and lay eggs under the same conditions. The ability of these larvae to feed and grow in the absence of light is rendered possible by their feeding habits; they take many types of organic material, living and dead, but do not require green plants, which could not be present in complete darkness. *P. A. B.*

Roubaud (E.), Treillard (M.) & Toumanoff (C.). Nouvelles expériences d'intercroisement de biotypes chez l'*Anopheles maculipennis*. [**New Experiments in the Crossbreeding of Biotypes in** *Anopheles maculipennis*.]—*Bull. Soc. Path. Exot.* 1936. Oct. 14. Vol. 29. No. 8. pp. 898–901. With 3 figs.

Impelled thereto by the experience and assertions of Dutch writers, who consider that the races *typicus* and *atroparvus*, which exist together in the Netherlands, are in nature mutually sterile, the present authors have undertaken and are still conducting crossbreeding experiments, the results of which indicate that it is possible to obtain during several generations perfectly fertile and viable hybrids between the *typicus* and *atroparvus* groups. Egg-characters in support of this statement are described and figured. The races or varieties employed in the experiments were the Portuguese *cambournaci* (a near ally of the ordinary European *atroparvus*), and a Parisian strain of *A. maculipennis* var. *typicus*.

It is believed that hybrids such as those described in this paper are actually met with in nature. *E. E. Austen.*

YAMADA (Manabu). **Four Kinds of Anopheline Mosquitoes in Chosen.** —*Keijo Jl. of Med.* 1936. Sept. 25. Vol. 7. No. 2. pp. 191–210. With 10 plates. [24 refs.]

The anopheline fauna of Chosen (Korea) consists of three species and a variety:—*A. koreicus*, *A. sineroides*, *A. edwardsi*, and *A. hyrcanus* var. *sinensis*. Of these the last mentioned "is the most common and the other three are extremely rare"; while *A. hyrcanus* var. *sinensis* is practically ubiquitous, the remaining species, which breed by preference in cool water, are found for the most part in the hills. No detailed descriptions of the egg, larva and pupa of *A. koreicus*, *A. sineroides* and *A. edwardsi* have hitherto been published. The author, however, has, since 1932, reared these species in the laboratory, and now describes and gives detailed illustrations of their eggs, fourth stage larvae and pupae, as well as of the corresponding stages of *A. hyrcanus* var. *sinensis*. The descriptions are followed by a synoptic table of the female adults, and keys to the various stages. Figures of the female wing, and other adult characters, in *A. sineroides*, *A. koreicus* and *A. edwardsi* are given in the concluding plate.

E. E. A.

BONNE-WEPSTER (J.) & BRUG (S. L.). Nederlandsch-Indische Culicinen.— *Geneesk. Tijdschr. v. Nederl.-Indië.* 1937. Mar. 2. Vol. 77. No. 9–10. pp. 515–617. With 47 figs. [11 refs.]

STONE (William S.). **A Method of staining Protozoa in Bulk.**— *Jl. Lab. & Clin. Med.* 1936. May. Vol. 21. No. 8. pp. 839–842. With 1 fig.

The method described is that of adding the fixative, *e.g.*, Schaudinn's fluid, to a liquid or emulsion containing protozoa. By centrifuging and removal of supernatant fluid after the addition of each necessary liquid it is possible to stain, dehydrate and clear and bring into xylol balsam the sediment, which can then be placed on a slide and mounted under a cover glass. The method was described by the reviewer in his "Protozoology" p. 1324. *C. M. Wenyon.*

GÖNNERT (R.) & WESTPHAL (A.). Zur Technik der Stuhluntersuchung auf Protozoen. [**Technique of Stool Examination for Protozoa.**]— *Arch. f. Schiffs- u. Trop.-Hyg.* 1936. Jan. Vol. 40. No. 1. pp. 5–16.

In actual practice it is often impossible to be in a position to examine the faeces of an individual on more than one occasion for intestinal protozoa. To test the value of the single specimen examination the authors have examined at Hamburg 444 persons from various parts of the world. The single normal stool of each was subjected to various tests, as follows:—fresh preparations, stained films, concentration, and cultivation in five different media. The general result has been the demonstration of protozoa in 69·3 per cent. of the specimens, which were made up as follows:—*E. histolytica* 34·9 per cent., *E. coli* 19·8 per cent., *I. bütschlii* 17·1 per cent., *E. nana* 17·1 per cent., *D. fragilis* 26·4 per cent., *Lamblia* 13·5 per cent.,

Trichomonas 2·5 per cent., *Chilomastix* 1·4 per cent., *Tricercomonas* 4·3 per cent. For details of the method of carrying out the examination the original must be consulted. *C. M. W.*

Hegner (Robert). **Reactions of Intestinal Protozoa to Environmental Changes in Vitro and in Vivo.**—*Rev. Parasit., Clin. y Lab.* Habana. 1936. May–June. Vol. 2. No. 3. pp. 385–401. [43 refs.]

In this paper the author gives a general account of a series of investigations which have been carried out in his laboratory during the past 15 years. The results have been already published in a number of papers, but here is a very useful summary of the results. The subject has to do with the reaction of intestinal protozoa to normal and modified environmental conditions *in vitro* and *in vivo*. To this end various types of culture media were employed, as also young chicks, which proved to be easily infectible with certain intestinal protozoa of man and animals, and rats which had been freed of their trichomonad infections by the administration of carbarsone (0·1 gm. in drinking water for five days). The experiments appeared to indicate that intestinal protozoa maintained themselves in the intestine of animals only in the presence of starch, but so far it has not been possible to prove that this applies to man. Certain clues were obtained as to the influence of hydrogen-ion concentration and variations in the bacterial flora of the intestinal contents. Similarly the growth of protozoa in culture media depends on various factors. It has been shown that faecal extracts added to the culture media favour growth in many cases. Investigations of the type indicated are still in progress and it is hoped that these will throw further light on the influence of environmental changes on intestinal protozoa. *C. M. W.*

Hegner (Robert). **Viability of Parasitic Protozoa after the Death of the Host.**—*Amer. Jl. Hyg.* 1936. Sept. Vol. 24. No. 2. pp. 309–317.

In warm-blooded animals protozoa remain alive after the death of the host for periods which vary with the temperature. Thus trichomonads in the dead rat live for 24 hours at a temperature of 37°C., and for 13 days at 5°C. Balantidia were alive in the caecum of the guineapig after four days both at laboratory temperature and at 5°C. In the frog intestinal protozoa live for 2 to 20 days. In canaries *Plasmodium cathemerium* was capable of infecting birds after 48 hours at 5°C. *Trypanosoma lewisi* was similarly alive after 3 days at room temperature and after 10 days at 5°C. *C. M. W.*

Frye (William W.) & Meleney (Henry E.). **Intestinal Protozoa in Human Autopsies.**—*Jl. Parasitology.* 1936. June. Vol. 22. No. 3. pp. 300–301.

The examination of the colon in 46 autopsies showed intestinal protozoa in five (*Trichomonas hominis* 3, *Giardia intestinalis* 1, *Endolimax nana* 1). Living trophozoites of *Giardia* and *Trichomonas* were present 12 or more hours after death. The incidence of the infections was lower than that given by examinations of cases during life, and it is concluded that many infections are lost during the course of the final illness. *C. M. W.*

JAHN (Theodore Louis). **Effect of Aeration and Lack of CO_2 on Growth of Bacteria-Free Cultures of Protozoa.**—*Proc. Soc. Experim. Biol. & Med.* 1936. Jan. Vol. 33. No. 4. pp. 494–498. With 1 fig.

As CO_2 appears to be necessary to the growth of bacteria, yeasts and moulds on solid media, it was thought advisable to test the value of CO_2 in the cultivation of certain protozoa. The test was made on bacteria free cultures of *Glaucoma piriformis* and *Chilomonas paramecium* in heavily buffered casein peptone medium through which varying quantities of CO_2 were passed. As regards *G. piriformis* lack of CO_2 has apparently no effect on the growth, whereas on that of *C. paramecium* it causes a lower initial growth rate and a prolongation of the initial lag period. It is suggested that in those cases where absence of CO_2 from the medium hinders growth this is due to the consequent abstraction of CO_2 from the organisms, causing a shift in the bicarbonate buffer system and possibly a change in pH of the protoplasm.

C. M. W.

BRUG (S. L.). **A Simple Method of plotting Logarithmic Growth-Curves of Protozoal Cultures.**—*Ann. Trop. Med. & Parasit.* 1936. Oct. 21. Vol. 30. No. 3. pp. 357–359. With 1 diagram.

In order to chart the rise and fall of the number of organisms occurring from day to day in cultures of protozoa convenient curves are obtained by charting on millimeter squared paper the log to the base 2 of the number of organisms present at any time, instead of either the actual numbers or the usual log to the base 10.

C. M. W.

DOBELL (Clifford). **Researches on the Intestinal Protozoa of Monkeys and Man. VII. On the *Enteromonas* of Macaques and *Embadomonas intestinalis*.**—*Parasitology.* 1935. Oct. Vol. 27. No. 4. pp. 564–592. [51 refs.]

In this paper the author discusses experiments he has carried out with *Enteromonas hominis* and *Embadomonas intestinalis*, two intestinal flagellates of man which it is concluded are identical with similar forms in certain monkeys. As regards the nomenclature of the former, it is noted that a previous conclusion was reached in 1921 that the flagellate described by WENYON and O'CONNOR in 1917 as *Tricercomonas intestinalis* probably represented FONSECA'S *Enteromonas hominis* which, however, was never correctly described by that observer. It is now recorded that the reviewer was able to obtain FONSECA'S type specimens and that he and the author were able to see that the flagellates in those slides had the structure of the organism described as *T. intestinalis* by WENYON and O'CONNOR. It follows therefore that the flagellate named *Enteromonas hominis* by FONSECA in 1915 had actually this structure and that, as the author had inferred in 1921, *Tricercomonas intestinalis* becomes a synonym of *Enteromonas hominis*, which is the correct name for the flagellate. It is further concluded that the flagellates which have been described from monkeys or man under the names *Octomitus* and *Hexamita* are merely double individuals of *Enteromonas* resulting from arrested binary fission, such forms being of common occurrence in cultures.

The cultivation of *E. hominis* is described, as also an unsuccessful attempt to infect man by administering cysts produced in a culture of a monkey strain.

As regards *Embadomonas intestinalis* the author points out that he is in disagreement with the view expressed by WENRICH that Grassi's original genus *Retortamonas*, founded for a flagellate of the mole-cricket, has priority over the name *Embadomonas*, which would be merely a synonym. He points out that these genera, as defined by their founders, have almost nothing in common. The name *Embadomonas intestinalis* for the flagellate of man is thus, in the author's opinion, the correct one. The flagellate has been cultivated by him from man, but two attempts to infect monkeys have failed. In spite of this failure, and that with *Enteromonas hominis*, the author is of the opinion that the evidence produced in other respects is sufficient to justify the conclusion that it seems probable that these flagellates are common to man and monkeys, and that only one species of such exists in these hosts. *C. M. W.*

DOBELL (Clifford). **Researches on the Intestinal Protozoa of Monkeys and Man. VIII. An Experimental Study of Some Simian Strains of "*Entamoeba coli*."**—*Parasitology*. 1936. Oct. Vol. 28. No. 4. pp. 541–593. [46 refs.]

This paper, the eighth of the series dealing with the relationship of the intestinal protozoa of monkeys to the morphologically similar forms in man, describes, in that meticulous detail to which readers of the series have become accustomed, the exhaustive investigations which have led to the conclusion that the *Entamoeba coli*-like amoeba of certain oriental monkeys and the common marmoset is actually *Entamoeba coli* itself. Pure strains of the amoeba, that is, strains uncontaminated with other protozoa, have been isolated in culture from man and monkeys and cross infections successfully produced. In macaques these have persisted for from one to four and a half years, while an infection produced in man by a strain from the marmoset after passage through a macaque has already persisted for two years. A previous infection with a strain from a macaque lasted in the same individual, the author, for about six weeks. On many occasions the presence of the amoebae can only be determined by culture methods which, as far as *E. coli* is concerned, are more difficult to apply than to any other intestinal amoeba of man or monkey. Much depends on the presence of the right bacteria, the best of which, in these experiments, were obtained from the faeces of the marmoset. With this combination of unidentified bacteria it has been possible to cultivate *E. coli* from any infected host and to maintain it satisfactorily throughout its entire life history in subculture, provided careful supervision, particularly as regards the correct temperature, is given. Cysts from cultures were very resistant to cold, one batch proving viable after having been kept at 1°–2°C. for 135 days. At ordinary room temperature cysts from cultures will survive for 51 days. It has been found impossible to infect kittens with this amoeba, which in all the experiments has shown no sign of pathogenicity either to man or monkey. A number of strains have been proved to ingest red blood corpuscles as readily as does *E. histolytica* when these have been added to the cultures. The author therefore finds it impossible to believe that *E. coli* is unable to do the same when in the human intestine,

and concludes that the finding of amoebae containing red blood cells in a human stool cannot be accepted alone as unquestionable evidence of infection with *E. histolytica*. Most protozoologists of experience will no doubt agree with this, though it must be a very rare occurrence for anyone to base a diagnosis of *E. histolytica* on this single character alone. The reviewer cannot remember ever having done so. It is perhaps not fully realized that in the actual practice of faeces examination for the presence of protozoa it is a relatively rare experience to observe amoebae with included red blood corpuscles even in cases of undoubted *E. histolytica* infection. That *E. coli* in the human intestine may occasionally ingest red blood corpuscles seems probable, though this has not yet been demonstrated, but its occurrence must be so rare that errors of diagnosis resulting from it must be almost negligible. The reviewer, who may claim to have had a fair experience of examinations for protozoa, has never seen in faeces an *E. coli* with ingested red blood corpuscles. *C. M. W.*

Knowles (R.) & Das Gupta (B. M.). **Some Observations on the Intestinal Protozoa of Macaques.**—*Indian Jl. Med. Res.* 1936. Oct. Vol. 24. No. 2. pp. 547–556. With 20 figs. on 1 plate. [15 refs.]

The paper gives a record of the results of examination for intestinal protozoa of 27 monkeys (*Silenus irus*). Amoebae, flagellates and ciliates corresponding in structure with all the common intestinal protozoa of man, with the exception of *Embadomonas intestinalis*, were found. A human volunteer was successfully infected with *E. nana* of the monkey. *C. M. W.*

Redaelli (Piero). L'épreuve pexique au rouge Congo dans l'histoplasmose expérimentale. (Réticulo-histiocytose systématique par "Histoplasma capsulatum" Darling.) Note préliminaire.—[**Congo Red Pexic Test in Experimental Histoplasmosis.**]—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1935. Aug.–Sept. Vol. 7. No. 8–9. pp. 312–316.

The paper suggests that the successful development of histoplasma and leishmania in animals depends on the power of the cells of the reticulo-endothelial system to ingest them. This power can be gauged by the congo red test, in which the phagocytic capacity of these cells can be estimated from the extent of the ingestion of the dye when this is injected. *C. M. W.*

Escomel (E.). Entérocôlite par *Enteromonas hominis* au Pérou. [**Enterocolitis associated with** *E. hominis* **in Peru.**]—*Bull. Soc. Path. Exot.* 1935. Oct. 9. Vol. 28. No. 8. pp. 710–713.

The author believes that the small intestinal flagellate *Enteromonas hominis*, like other intestinal flagellates, is capable of giving rise to a condition of entero-colitis. For this flagellate infection oral administration of a mixture containing essence of terebinth and paregoric is almost a specific treatment. *C. M. W.*

Limine (M.). La coccidiose humaine en Abkhasie. [**Human Coccidiosis in Abkhasia.**]—*Bull. Soc. Path. Exot.* 1935. Dec. 11. Vol. 28. No. 10. pp. 914–915.

The report deals with human coccidiosis (*Isospora belli*), 19 cases of which were seen in 1931 in Abkhasia, on the eastern coast of the Black Sea. The ages of the patients varied from 2 to 30 years. Gastro-intestinal symptoms were present in several, one case being in hospital for 24 days. Faecal examinations remained positive for about four months. *C. M. W.*

Abril Cánovas (Mariano) & Darriba (Antonio R.). Un caso de parasitismo humano por coccidia (*Isospora belli*) en España. [**Human Infection with** *I. belli* **in Spain.**]—*Medicina Países Cálidos.* Madrid. 1935. Oct. Vol. 8. No. 10. pp. 475–480. With 3 figs. English summary (3 lines).

The paper describes a case of coccidial (*Isospora belli*) infection in a child eight years of age at Orihuela (Alicante). *C. M. W.*

Corcuff (C.). Deux observations d'*Isospora belli* au Maroc. [**Two Observations of** *I. belli* **in Morocco.**]—*Ann. Parasit. Humaine et Comparée.* 1936. Sept. 1. Vol. 14. No. 5. pp. 440–443. With 2 figs.

In each of these cases oöcysts of the coccidium were found in the stools on two occasions at intervals of a few days. The symptoms, which appeared to be due to the coccidial infection, as no other cause could be found, were somewhat indefinite and consisted of colic, diarrhoea and general debility. *C. M. W.*

Smyly (H. Jocelyn) & Chang (Kuei). **Two Cases of Coccidiosis in Man.** —*Chinese Med. Jl.* 1936. Sept. Vol. 50. No. 9. pp. 1195–1202. With 5 figs. [11 refs.]

A record of two cases of *Isospora belli* infection in N. China, one in a Chinese male hospital assistant and the other in an English lady. There were no symptoms attributable to the coccidial infection.

C. M. W.

Galliard (H.). Premier cas de coccidiose humaine à *Isospora belli* Wenyon 1923 signalé au Tonkin. [**First Case of Human** *I. belli* **Infection in Tonking.**]—*Bull. Soc. Path. Exot.* 1936. Feb. 12. Vol. 29. No. 2. pp. 118–120.

A child two years of age, suffering from diarrhoea and much emaciated, was admitted to the hospital at Hanoi five days before its death. On the first and second days in hospital there were detected in the stools oöcysts of *Isospora belli* and eggs of ascaris. After that the stools became more liquid and the only finding was ascaris eggs on the fourth day. After death the intestine was carefully examined at various levels by scraping and section for evidence of coccidial infection, but nothing was found. *C. M. W.*

Ivanić (Momčilo). Ueber den Bläschenkernbau und die promitotische Kernteilung eines im menschlichen Enddarme lebenden Pilzes (*Blastocystis hominis* Brumpt). [**Structure of Vesicular Nucleus and Promitotic Nuclear Division of** *B. hominis.*]—*Arch. f. Protistenk.* 1936. Vol. 87. No. 2. pp. 242–247. With 14 figs.

The fungus-like organism *Blastocystis hominis* possesses a nucleus of a vesicular type with central karyosome and peripheral chromatin. When the nucleus divides it does so by mitosis in which the karyosomes form pole caps and the chromatin an equatorial plate represented by what are apparently two chromosomes. *C. M. W.*

Redaelli (P.) & Ciferri (R.). Une nouvelle hypothèse sur la nature du *Blastocystis hominis.* [**A New Hypothesis as to the Nature of** *Blastocystis hominis.*]—*Boll. Sezione Ital., Soc. Internaz. di Microbiologia.* Milan. 1935. Aug.–Sept. Vol. 7. No. 8–9. pp. 321–325.

The view is expressed that *Blastocystis* is a member of the family Protothecaceae Printz. *C. M. W.*

Redaelli (P.) & Ciferri (R.). Argomenti a favore di una sistemazione del genere "Blastocystis" nelle Algae. [**Arguments in Favour of placing the Genus** *Blastocystis* **in the Algae.**]—*Boll. Istituto Sieroterap. Milanese.* 1936. Mar. Vol. 15. No. 3. pp. 154–170. With 7 figs. on 1 plate. [64 refs.] German summary.

This is a long paper in which the author argues that *Blastocystis* is actually one of the algae related to *Prototheca portoricensis* of the family Chlorophyceae. *C. M. W.*

Ciferri (R.) & Redaelli (P.). Morfologia, biologia e posizione sistematica di *Coccidioides immitis* Stiles e delle sue varietà, con notizie sul granuloma coccidioide. [**Morphology, Biology and Systematic Position of** *Coccidioides immitis* **and of its Varieties, with Notes on Coccidioidal Granuloma.**]—Reprinted from *Mem. R. Accad. Ital.* 1936. Vol. 7. pp. 399–475. With 13 figs. & 8 plates. [90 refs.]

In this article the authors discuss *Coccidioides immitis* from every point of view and show how it is related to other fungoid organisms such as *Histoplasma* and *Rhinosporidium.* Its characters, life history, pathology and culture are fully described and illustrated, the whole article being a comprehensive treatise on the subject. Mycologists are referred to the article for full details. *C. M. W.*

Fantham (H. B.) & Porter (Annie). **Some Entozoa of Man as seen in Canada and South Africa.**—Reprinted from *Canadian Med. Assoc. Jl.* 1936. Vol. 34. pp. 414–421.

In this article the results of the examination of human beings for intestinal protozoa and helminths in Montreal are compared with those previously obtained in Johannesburg. It is noted that the general similarity of the infections is striking, the figures, with a few exceptions

which are easily explicable, being comparable. It has to be noted that the examinations were not necessarily confined to the indigenous population. *C. M. W.*

COATNEY (G. Robert) & ROUDABUSH (Robert L.). **A Catalog and Host-Index of the Genus *Plasmodium*.**—*Jl. Parasitology.* 1936. Aug. Vol. 22. No. 4. pp. 338–353. [230 refs.]

This very useful catalogue of the genus *Plasmodium* gives a list of the various species of the genus and lists of the hosts under the headings Reptilia, Aves and Mammals. A very full bibliography is appended. *C. M. W.*

SASSUCHIN (D.). Blutparasitare Krankheiten der Nager und einiger anderer Säugetiere. [**Blood Parasites of Rodents and Other Mammals.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1936. Vol. 15. No. 1. [In Russian pp. 45–56. With 3 figs. & 1 plate. [34 refs.] German summary p. 56.]

During investigation work on plague, typhus, leishmaniasis and other diseases in the past three years in S.E. Russia, a number of rodents and other small mammals have been subject to laboratory experiment. The blood of 34 species has been examined for blood parasites, with the result that species of the following parasites have been recorded :—*Hepatozoa, Grahamia, Piroplasma, Nuttallia, Toxoplasma, Trypanosoma* and *Leucocytogregarina.* In various lists the hosts and species of parasite are given. The exact meaning of *Leucocytogregarina* found in smears of the organs is not clear but the microphotograph of the parasite, which is recorded only from one mouse, suggests spores of *Sarcocystis.* *C. M. W.*

BYRD (Elon E.). **Studies in Parasitology. V. The Intestinal Parasites in 257 College Freshmen.**—*Jl. Parasitology.* 1936. June. Vol. 22. No. 3. pp. 301–302.

The stools of 257 freshmen at the University of Georgia were examined for intestinal protozoa with the following results in percentages :—*Endolimax nana* 23·73, *Entamoeba coli* 22·18, *Giardia intestinalis* 12·84, *E. histolytica* 7·78, *Iodamoeba bütschlii* 2·72, *Chilomastix mesnili* 0·38, *Trichomonas hominis* 0·38, *Blastocystis hominis* 11·67. *C. M. W.*

BROOM (J. C.), BROWN (H. C.) & HOARE (C. A.). **Studies in Microcataphoresis. II. The Electric Charge of Haemoflagellates.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1936. June 30. Vol. 30. No. 1. pp. 87–100. With 4 figs. [16 refs.]

The determination of the electric charge of trypanosomes from the blood of infected mice, rats and guineapigs has shown that this may be either positive or negative. As a rule, if the infection in the animal is a continuous one leading to death, the charge of the trypanosome remains constant throughout. If, on the other hand, the trypanosomes disappear from the blood for a period and then reappear again in a relapse, it is found that the reappearance is associated with a reversal of the charge. On one occasion, however, the charge of *Trypanosoma*

brucei changed during the course of a continuous mouse infection. Drug-resistant strains had the same charge as the normal strains. A change of host, such as mouse to guineapig, may bring about a change in charge. The cultural forms of trypanosomes and leishmania and the developmental forms of the sheep trypanosome (*T. melophagium*) in the ked are all negatively charged. It has been shown that the positive variant of a strain of *T. evansi* was distinctly more susceptible to the action of tryparsamide than the negative one. A simple test for the determination of the charge of a trypanosome is described as follows :—Add 0·002 cc. of infected blood to 0·3 cc. of a mixture of one volume of normal saline and nine volumes of 4 per cent. glucose. Interaction is allowed to occur for half an hour at room temperature, when a drop of the suspension is observed with a one-sixth objective. Positively charged trypanosomes will be adherent to the red blood corpuscles, while negatively charged ones will be free. *C. M. W.*

Wagner (O.) & Hees (E.). Der kulturelle Nachweis von *Trichomonas vaginalis* und anderen Trichomonasarten. [**Cultural Demonstration of *Trichomonas vaginalis* and Other Species of Trichomonas.**]—*Zent. f. Bakt.* I. Abt. Orig. 1935. Nov. 15. Vol. 135. No. 4/5. pp. 310–317.

—— & ——. 156 positive Trichomonasblutbefunde bei Mensch und Tier. [**156 Positive Trichomonas Findings in the Blood of Man and Animals.**]—*Ibid.* 1937. Feb. 16. Vol. 138. No. 5/6. pp. 273–290. With 7 figs. [11 refs.]

These two papers have to do with the cultivation of various trichomonads. In the first paper the forms mostly dealt with are *T. vaginalis*, the similar form which inhabits the genital tract of cattle, and the pigeon trichomonas. By cultivation methods trichomonas has been isolated in the case of human beings not only from the vagina but also from the upper parts of the genital tract, from ovarian cysts and retroperitoneal abscesses and other similar situations. Cultures from cattle have been made on the same lines, while in the case of the pigeon trichomonas this has been inoculated intraperitoneally to mice, leading to liver abscesses in the pus of which the flagellate occurred in enormous numbers. Trichomonas has also been cultivated from the human alimentary canal, including the mouth and throat. It is also stated that trichomonas was grown from arm venous blood. For cultivation of trichomonas with bacteria the medium found most useful is the one used for the dysentery amoeba—a horse serum slope covered with a 10 per cent. solution of egg albumin in buffered physiological saline. The bacterial growth is kept down by removing and renewing the liquid every day. The main growth of flagellates occurs at the lower end of the tube and enough are left each day to continue the culture. Other media mentioned are serum and blood bouillon which, however, are not so useful as the amoeba medium, at any rate for the bacterially contaminated cultures.

The second paper deals especially with cultivation of trichomonas from the blood, a brief mention of which was made in the first. It is not stated definitely what was the technique of blood culture, but presumably the method used was that discussed in the first paper. In the case of human beings, the majority of whom were women with vaginal infection, of 75 cases a positive result was obtained in 55. In some of these cases, both women and men, there was no evidence of

infection elsewhere than in the blood. Similar results were obtained with horses and cattle. It is not concluded that the blood trichomonas, which were only demonstrable by culture methods, are in any way pathogenic. It would seem that they gain entrance to the blood when there are lesions which allow of their passage through the membranes.

C. M. W.

Bland (P. Brooke) & Rakoff (A. E.). **Some Bacteriologic Aspects of *Trichomonas vaginalis* Vaginitis.**—*Vida Nueva.* 1936. May 15. Vol. 37. No. 5. pp. 467–484. With 6 figs. [28 refs.]

An attempt has been made to investigate the nature of the bacterial flora associated with *Trichomonas vaginalis* infections. It is found that the flora is an abnormal one and that any such abnormal flora will conduce to infection with the flagellate if this is not already present. The type of relationship between the flagellates and the bacteria is not properly understood, but it has been noted that Döderlein's bacilli make their appearance as the flagellates disappear, while the appearance of the flagellates is always associated with the disappearance of these bacilli. *C. M. W.*

Vazquez-Colet (Ana) & Tubangui (Marcos). **The Identity and Incidence of a Flagellated Protozoan Parasite found in Human Urine.**—*Jl. Philippine Islands Med. Assoc.* 1936. Apr. Vol. 16. No. 4. pp. 231–234. With 1 fig.

The paper records the presence of *Trichomonas vaginalis* in the Philippines. It is noted that in urine the flagellate may degenerate and be erroneously identified as some other protozoan such as *Prowazekia urinaria*. The question arises as to whether this organism is not merely a degenerate *Trichomonas*. *T. vaginalis* was found in the urine of both women and men. Inoculated into the vagina of monkeys the culture forms in Barrett's medium produced infection in one instance. No evidence that *T. vaginalis* is pathogenic was obtained. It was shown that it would remain viable outside the body in a semi-dry state for at least six hours. *C. M. W.*

Miller (James Raglan). **Contrast Stain for the Rapid Identification of *Trichomonas vaginalis*.**—*Jl. Amer. Med. Assoc.* 1936. Feb. 22. Vol. 106. No. 8. p. 616.

The examination of pus for the presence of *Trichomonas vaginalis* is facilitated by mixing with 0·1 per cent. safranin solution, whereby the unstained flagellates stand out in contrast to the stained pus cells around them. *C. M. W.*

Wendlberger (J.). Zur Pathogenität der *Trichomonas vaginalis*. [**Pathogenicity of *Trichomonas vaginalis***.]—*Arch. f. Dermat. u. Syph.* 1936. Oct. 28. Vol. 174. No. 6. pp. 583–590. With 2 figs. [10 refs.]

By using cultures of *Trichomonas vaginalis* to prepare trichomonas antigen the author claims to have shown that the serum of infected individuals may give a complement fixation reaction, so that he concludes that the organism in these cases is definitely pathogenic.

C. M. W.

Cicchitto (Angelo M.). Sulla patogenicità del *Trichomonas intestinalis*. [**Pathogenicity of** *T. intestinalis*.]—*Ann. di Med. Nav. e Colon.* 1936. Jan.–Feb. 42nd Year. Vol. 1. No. 1–2. pp. 27–33. [22 refs.]

——. Sulla patogenicità del *Chilomastix mesnili*. [**Pathogenicity of** *C. mesnili*.]—*Policlinico.* Sez. Prat. 1936. May 25. Vol. 43. No. 21. pp. 955–8, 961–2, 965–6. [29 refs.]

From observations on 28 cases of trichomonas and 31 cases of chilomastix infection the author argues in favour of the pathogenicity of these flagellates. In these infections stovarsol and yatren treatment is to be regarded as specific. *C. M. W.*

Westphal (Albert). Zur Morphologie, Biologie und Infektionsfähigkeit der viergeisseligen Trichomonasarten des Menschen. [**Morphology, Biology and Infectivity of the Quadriflagellate Species of the Trichomonads of Man.**]—*Zent. f. Bakt.* I. Abt. Orig. 1936. Oct. 6. Vol. 137. No. 6/7. pp. 363–376. With 9 figs. [50 refs.]

An investigation of human trichomonads has convinced the author that there are three species possessing four flagella. The intestinal form, *Trichomonas hominis*, has a free flagellum extending beyond the undulating membrane and is easily cultivated; *T. elongatum* of the mouth is not so easily cultivated, has a poorly developed basal fibre and no free flagellum; *T. vaginalis* is still less easily cultivated, has a well developed basal fibre and no free flagellum. *C. M. W.*

Becker (Elery R.) & Morehouse (Neal F.). **Vitamin G from Different Sources and Coccidian Infection.**—*Proc. Soc. Experim. Biol. & Med.* 1936. May. Vol. 34. No. 4. pp. 437–439.

The authors, who have previously shown that the development of coccidia (*Eimeria miyairii*) in the rat is hindered if the animals are deprived of vitamin G, now show that the development is stimulated if the diet is made rich in this vitamin. The experiments conclusively indicate that coccidium growth is tied up with the vitamin G complex. *C. M. W.*

Nishiyama (Masao). Ueber das Vorkommen von Darmspirochäten bei Menschen und Tieren. [**Incidence of Intestinal Spirochaetes in Man and Animals.**]—*Zent. f. Bakt.* I. Abt. Orig. 1936. Apr. 30. Vol. 136. No. 5/6. pp. 370–382. With 2 figs.

The examination of human beings of all ages in Japan has shown that spirochaetes of the type *S. eurygyrata* and *S. stenogyrata* are of fairly frequent occurrence in the caecum and colon. They are not to be regarded as in any way pathogenic. A record is also given of the occurrence of spirochaetes in the faeces of a number of animals in the zoological gardens of Ueno. *C. M. W.*

Brug (S. L.). **On Particular Binucleate Bodies often found in Human Faeces.**—*Ann. Trop. Med. & Parasit.* 1936. Apr. 8. Vol. 30. No. 1. pp. 33–35. With 18 figs.

The author has frequently found in human faeces cyst-like bodies measuring from 5 to 8 microns in longest diameter. The cyst wall,

often subject to irregular thickening, encloses a cytoplasmic body which does not fill the cyst, so that a space is left between it and the cyst wall. Within the cytoplasm are two deeply staining granules or nuclei. If a large vacuole occurred in the cytoplasm there would be resemblance to blastocystis. It is possible that the cysts described may have some connexion with this parasite. The author refers to them as Bosman-cysts from the name of the first individual in whom he found them. *C. M. W.*

Ivanić (Momčilo). Beiträge zur Kenntnis der Entwicklungsgeschichte einer im menschlichen Enddarme lebenden Endolimax-Amöbe (Endolimax Gildemeisteri spec. nov.). [**Development of an *Endolimax* from the Human Large Intestine (*E. gildemeisteri* n. sp.)**]—*Zent. f. Bakt.* I. Abt. Orig. 1936. Oct. 6. Vol. 137. No. 6/7. pp. 377–398. With 10 text figs. & 60 figs. on 1 double plate. [14 refs.]

From a human stool which was thought to contain entamoebae the author made stained preparations. An examination of these convinced him that the organism was not an entamoeba, though entamoeba-like forms were present, but a species of *Endolimax* which, however, appeared to be distinct from *E. nana*. The amoeba itself is very variable in form, multiplies by binary fission, has a nucleus dividing by promitosis or mitosis and gives rise in some cases to multinucleate forms and "resting stages" with eight nuclei. A new species, *Endolimax gildemeisteri*, is created for the amoeba, which is illustrated by numerous text and plate figures. It would seem doubtful whether the evidence obtained from stained preparations made from a single stool of uncertain age is sufficient to justify the establishment of a new species and the numerous processes of development attributed to the amoeba. *C. M. W.*

Rodhain (J.) & van Hoof (M. T.). Sur le pouvoir hématophage de *Entamoeba invadens*. [**Ingestion of Red Blood Corpuscles by *E. invadens*.**]—*C. R. Soc. Biol.* 1936. Vol. 123. No. 26. pp. 138–141. With 1 fig.

Amoebae from cultures of *Entamoeba invadens* of snakes are capable of ingesting reptilian and human red blood corpuscles. As has been pointed out by Geiman and Ratcliffe, this amoeba may also exhibit cannibalism. *C. M. W.*

Simici (D.), Popesco (M.) & Covaceano (C.). Considérations sur l'importance séméiologique des épreuves Meltzer-Lyon et de Carnot et Gaehlinger pour la recherche de l'infestation du duodénum et des voies biliaires par les Lamblias intestinalis. [**The Meltzer-Lyon and the Carnot and Gaehlinger Tests in the Study of *Lamblia intestinalis* Infections.**]—*Bull. Acad. Méd. Roumanie.* Bucharest. 1936. 1st Year. Vol. 2. No. 4. pp. 664–669.

Investigations by the duodenal sound of cases of lamblia infection submitted to the Meltzer-Lyon test appear to indicate that infection of the gall-bladder with the flagellate is of fairly common occurrence. If, however, the Carnot and Gaehlinger test is also applied the impression is gained that the increase of flagellates in the later samples

of bile from the duodenum is due rather to their detachment from the duodenal mucosa than to their expulsion from the gall bladder.

C. M. W.

VARGA (L.). Etudes sur la faune des protozoaires de quelques sols du Sahara et des hauts plateaux algériens.—*Ann. Inst. Pasteur.* 1936. Jan. Vol. 56. No. 1. pp. 101–123.

CORRESPONDENCE.

To the Editor of the Tropical Diseases Bulletin.

Sir,

In the March number of the *Tropical Diseases Bulletin* (p. 258) Dr. Hamilton FAIRLEY has commented on my use of the expression "Bengal splenomegaly."

I was not aware that I was introducing a new expression, as it is one that we have used in Calcutta for a number of years. Dr. M. N. DE, in 1932, in a paper in the *Indian Journal of Medical Research* (p. 1029), described 38 cases of a condition which he differentiated from kala azar, malaria, or any other splenomegaly of known aetiology and gave some important clinical and histological findings. He did not, however, report any study of the blood picture, and he avoided the term "Bengal splenomegaly", though it was in current use at the time. I have apparently blundered in where a wiser man feared to tread, and though I cannot claim the credit I must accept the responsibility.

Writing in an editorial capacity in the *Indian Medical Gazette* (May 1935), I anticipated Dr. Hamilton FAIRLEY'S objection to the use of the words "Bengal splenomegaly."

> "By a process of not very deep reasoning the term 'tropical splenomegaly' has been applied to conditions of splenic enlargement of unknown aetiology that occur in the tropics, and for the condition as it is encountered in Bengal the term 'Bengal splenomegaly' has been applied. By a similar process of argument the cases of enlarged spleen that occur in the Punjab might very well, and probably have been, referred to as 'Punjab splenomegaly.' It might be said that such multiplication of names is ridiculous, but we do not agree; both Bengal and the Punjab are tropical (or sub-tropical) countries but in some ways their climates are as different from one another as either is from the climate in Italy, for example; it is therefore possible that the aetiology of the splenic enlargements in these two countries is different, and it is as well to maintain the distinction until such time as the conditions are shown to be the same."

The case described by Dr. Hamilton FAIRLEY is undoubtedly very similar to the cases of macrocytic anaemia and splenomegaly which I reported and which are very common in Bengal, but he has not suggested a better name to cover both, and it seems to me that it will be as well to leave this choice of a name until we learn something more about the aetiology of this disease.

Yours etc.,

L. E. NAPIER, M.R.C.P.(Lond.).

The Calcutta School of Tropical Medicine,
Central Avenue, Calcutta.
11th May, 1937.

REVIEWS AND NOTICES.

TOUMANOFF (C.). **L'anophélisme en Extrême-Orient. Contribution faunistique et biologique.** [Anophelines in the Far East.]—Préface de E. ROUBAUD.—pp. viii + 434. With 75 figs. [164 refs.] Collection de la Société de Pathologie Exotique. Monographie IV. 1936. Paris: Masson et Cie, 120 Boulevard Saint-Germain. [60 fr.]

The book by Dr. Toumanoff on the *Anopheles* of the French territories in south-east Asia is the first comprehensive account of the subject which has been written; it is based upon his own field work, which apparently occupied about four years. During that time he travelled widely, especially in Tonking, and he also visited the northern part of Annam, including the country of the Laos, which is that part of Annam on the westward or inland side of the watershed; it is, therefore, in the basin of the Mekong river, adjacent to Siam.

In the first section of the text the author deals with systematics and geographical distribution. He records 18 species of *Anopheles* for Tonking, three of which had not been previously reported from any part of Indo-China, and several others not critically determined by previous authors. Among the notes on local distribution it is recorded that *A. minimus*, otherwise widely distributed and common, is exceedingly rare in the region of the delta (the author has not discussed whether this is perhaps due to the presence of silt in the water, as it seems to be in certain parts of Assam): *A. maculatus* and *maculipalpis* are also absent from the same region.

In the mountainous region the author has discovered the presence of *A. gigas* var. *baileyi* and *A. lindesayi*. Considerable attention is given to the area above 4,500 feet, which had not previously been investigated. In the north of Annam *A. culicifacies* was discovered; it has already been recorded from Siam, but is new for Indo-China. The author also presents much information about the seasonal abundance of adults and larvae in Tonking and Cochin China separately.

The second portion of the book deals with the biology of the adult and larval insects. The reader is impressed with the very large amount of detailed information on breeding places and on the resting habits of adults.

In the third section the author discusses the relation of species of *Anopheles* to malaria. His general conclusion, based on its relative abundance in houses, on precipitin tests, and on finding sporozoites, is that in nearly all parts of the area the most important carrier is *A. minimus*, which is found infected in houses up to 3 or 4 per cent. *Jeyporiensis*, *aconitus*, *maculatus* and *vagus* are also shown to be carriers in some parts of the area under discussion.

Though much remains to be done, the author is to be congratulated, not only on his fruitful work, but also on presenting it in a volume which is an important contribution to the subject. He concludes by summarizing what is known from the surrounding countries.

P. A. Buxton.

OTTOLENGHI (Donato). **Problemi igienici della bonifica integrale. Biblioteca della Bonifica Integrale.**—Vol. 12. pp. vii + 128. With 32 figs. [57 refs.] 1936. Florence : S. A. G. Barbèra.

In writing in English on the subject of *bonifica integrale*, one has always to surmount the difficulty of finding an adequate English translation of that phrase. Exception might well be taken to bonification, though the verb to bonify was once current in the English language. Bonification, however, has now become so familiar to readers of malaria literature that to suggest an alternative might cause confusion.

Professor Ottolenghi's volume is devoted to the public health aspects of the question ; it is the twelfth and last of a series of volumes dealing with every aspect of integral bonification. It is, perhaps, hardly necessary to remind the reader that integral bonification is much more than land reclamation, though it includes that. Its aims are much wider in scope than the ultimate elimination or control of the breeding places of anopheline vectors of malaria, though this is one of the most striking results of the successfully completed scheme. It includes all the measures necessary to transform waste-land, generally malarious, into a prosperous agricultural tract inhabited by a rural community enjoying all the amenities, hygienic, social and other, that the engineer, social worker and medical profession can supply in a well-ordered state.

Professor Ottolenghi is well qualified to deal with the health questions involved, and he has produced a clearly expressed and interesting volume, that is, to all intents and purposes, a text-book on rural hygiene. Housing is well treated, both temporary accommodation for the labour forces and the permanent buildings of the community receiving attention. Rural water supplies and refuse disposal are adequately discussed. The chapter on malaria is the longest and the best, a simple, precise and full exposition that should be most useful to the local health official with but little practical experience. Tuberculosis is dealt with briefly, as is infant mortality. The importance of the selection and supervision of the immigrant population and of the protection of the health of the resident population is discussed. The last chapter is concerned with the relevant legislation. *Norman White.*

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